Biological Investigation of Contwoyto Lake, Northwest Territories, 1981-82

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by

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TABLE OF CONTENTS

	Page
ABSTRACT/RÉSUMÉ	iv
INTRODUCTION	1
STUDY AREA	1
HISTORICAL FISHING TRENDS	1
METHODS AND MATERIALS	2
Experimental gillnetting	2
Tagging	2
Biological analysis	2
Data analysis	2
RESULTS	3
Catch and effort statistics	3
Biological analysis	3
Lake trout	3
Arctic charr	3
Round whitefish	3
Lake cisco	3
Arctic grayling	3
Burbot	4
ACKNOWLEDGMENTS	4
REFERENCES	4

LIST OF TABLES

Table		Page
1	Catch and catch per unit effort data for fish caught by experimental gillnets from Contwoyto Lake, 1981 and 1982	5
	Biological data by length interval for lake trout caught by experimental gillnets from Contwoyto Lake	
2	1981-82	6
3	1981	7
4	1982	8
	Biological data by age group for lake trout caught by experimental gillnets from Contwoyto Lake	
5	1981-82	9
6	1981	10
7	1982	11
8	Biological data by length interval for tagged lake trout from Contwoyto Lake, 1981-82	12
9	Weight-length relationship summary for each fish species from Contwoyto Lake	13
10	Fecundity of lake trout from Contwoyto Lake	14
	Biological data for Arctic charr caught by experimental gillnets from Contwoyto Lake, 1981-82	
11	By length interval	15
12	By age group	15
13	Biological data by length interval for tagged Arctic charr from Contwoyto Lake, 1981-82	16
	Biological data for fish caught by experimental gillnets from Contwoyto Lake, 1981-82	
14	Round whitefish by length interval	16
15	Round whitefish by age group	17
16	Lake cisco by length interval	17
17	Lake cisco by age group	17

LIST OF FIGURES

Figure		Page
1	Map of the Northwest Territories showing the location of Contwoyto Lake	18
2	Map of Contwoyto Lake showing the experimental gillnet locations and tagging sites, 1981 and 1982	19
3	Length-frequency histograms of lake trout from Contwoyto Lake, 1981 and 1982	20
4	Age-frequency histograms of lake trout from Contwoyto Lake, 1981 and 1982	21
5	Length-at-age relationship for lake trout from Contwoyto Lake, 1981-82 compared with other northern lakes	22
6	Catch curves for lake trout and Arctic charr caught by experimental gillnets from Contwoyto Lake, 1981-82	23

LIST OF APPENDICES

Appendix		Page
1	Summary of information on sample dates, sample locations, set duration, depth and catch per unit effort for experimental gillnets on Contwoyto Lake, 1981 and 1982	24
2	A description of the codes for the relative stages of maturity used for northern fishes	25
	Biological data for fish species caught by tagging nets from Contwoyto Lake, 1981-82	
3	Lake trout by length interval	26
4	Lake trout by age group	27
5	Arctic charr by length interval	28
6	Arctic charr by age group	28
7	Round whitefish by length interval	29
8	Round whitefish by age group	29
9	Burbot by length interval	29
10	Burbot by age group	29

ABSTRACT

Roberge, M.M., L. Dahlke, and J.B. Dunn. 1986. Biological investigation of Contwoyto Lake, Northwest Territories, 1981-82. Can. Data Rep. Fish. Aquat. Sci. 605: iv + 29 p.

A two-year experimental gillnetting and biological sampling program was conducted on Contwoyto Lake in 1981-82. A tagging program was also carried out. Biological data includes length, weight, age, fecundity and maturity characteristics of the fish species caught.

Key words: Arctic charr; catch/effort; catch composition; gillnets; lake trout; population structure; tagging.

RÉSUMÉ

Roberge, M.M., L. Dahlke, and J.B. Dunn. 1986. Biological investigation of Contwoyto Lake, Northwest Territories, 1981-82. Can. Data Rep. Fish. Aquat. Sci. 605: iv + 29 p.

Un programme de pêche expérimentale au filet maillant et d'échantillonnage biologique d'une durée de deux ans a été appliqué au lac Contwoyto en 1981 et 1982. Un programme d'étiquetage a également été appliqué. Les données biologiques portent sur la longueur, le poids, l'âge, les caractéristiques de fécondité et de maturité des poissons capturés.

Mots-clés: Omble chevalier; prise/effort; composition des prises; filets maillants; touladi; structures de la population; étiquetage.

INTRODUCTION

There are numerous lakes within the District of Mackenzie, Northwest Territories for which there is very little, if any, biological data and/or harvest data which is necessary for recommending fishing potential and harvest levels. Some of these lakes have been commercially fished in the past on an annual or cycle quota basis. However at present with the low price of fish and high costs of transportation, many of these potential fisheries remain economically unfeasible. There has been, over the past decade, considerable interest in establishing sport fishing lodges on some of these lakes as well as an increase in itinerant sport fishing with the establishment of mining and oil and gas operations.

In 1980, the Department of Fisheries and Oceans (DFO) began a multi-year program to evaluate the commercial and sport fishing potential of lakes within the District of Mackenzie. The lakes of prime interest were those with existing or possible commercial/sport fishery use conflicts and lakes with existing or proposed mining operations. The objectives of the program were to collect necessary baseline data to assess the population structure and dynamics of the fish species inhabiting these inland lakes, to monitor the effects of exploitation by commercial and/or sport fishing, if any, and to assess the ability of the fish species to sustain exploitation.

As part of the assessment program on inland lakes a two-year study, started in 1981, was undertaken on Contwoyto Lake to assess the potential of the fish species inhabiting the lake to sustain exploitation. This report presents the findings of this study.

STUDY AREA

Contwoyto Lake, located approximately 400 km northeast of Yellowknife, NWT, is situated in the heart of the barrens in the Canadian Shield at 65°36'N and 110°39'W (Fig. 1). It has an area of approximately 95 900 ha and maximum length of 110.4 km (Inven. Can. Freshwater Lakes 1969). The lake drains both north and south through two rivers: the Burnside and the Back. The Burnside River flows from the northern end into Kathawachaga Lake and then into Bathurst Inlet. A falls located at the lower portion of the Burnside River restricts any fish movement upstream. At its southern end, Contwoyto Lake drains into Pellatt Lake and eventually into the Back River which in turn flows a considerable distance and finally drains into Chantrey Inlet.

Contwoyto Lake is located in the Western Mainland geographical region (Bird 1967). In the upland surfaces of this region the topography is gently undulating with long smooth slopes covered with till. In the centre, where Contwoyto Lake is located, the surface is crossed by shallow valleys that are blocked by glacial drift with widespread occurrence of eskers. The vegetation consists mainly of mosses, lichens, grasses and sedges, with dwarf willows, labrador tea and ground birch growing somewhat taller (Abrahamson 1964; Tremblay 1976). In the protected areas and near river beds brushes attain heights of 2 m.

The climate is subarctic with ice breakup occurring during July and ice reformation commencing towards the end of August (Tremblay 1976).

Studies have been conducted on the algal (Moore 1979), phytoplankton (Moore 1978a), zooplankton (Moore 1978b) and benthic invertebrate (Moore 1978c) communities inhabiting Contwoyto Lake. Information on the chemical condition of the water is provided by Moore (1978b,c, 1979).

In 1958, the Department of Northern Affairs and National Resources (now Department of Indian and Northern Affairs) conducted a test fishery in Contwoyto Lake to try and alleviate the extreme dependence, by the Inuit residing at the lake, upon caribou migrating through the area (F.S. Bailey, Department of Northern Affairs and National Resources, Fort Simpson, NWT, field report 29 August 1958). Studies were conducted from 1960 to 1965 to describe the glacial features and mineral deposits as well as map the area about the lake (Tremblay 1976). Most of the prospecting, stripping, rock trenching, geological mapping, diamond drilling and geophysical exploration was done between 1962 and 1963 (Tremblay 1976). Fisheries resources of Contwoyto Lake were documented in 1977 as part of the Arctic Land Use Research mapping program (Stewart and MacDonald 1978). In 1980, construction of a gold mining operation at Contwoyto Lake by the Echo Bay Mines Ltd. commenced with production starting in 1982. In conjunction with the gold mining operation, studies were conducted by consultants, from 1981 to 1984, to identify the potential fish use of the Concession Lake drainage basin and to identify the possible effects of the tailings pond drainage in this basin and Contwoyto Lake (Scientific Permits - R.W. Moshenko, Department of Fisheries and Oceans, Western Region, personal communication).

HISTORICAL FISHING TRENDS

Contwoyto Lake is utilized sporadically by the Inuit of the region. Inuit camp mainly along the south shore of the lake in the area which is within the caribou migration route. Fish are caught either by jigging through the ice or gillnetted from boats and are either consumed or utilized as dogfood or dried for later use.

Sport fishing until recently has been light. There was an air navigation beacon and weather station located in the southeast end of the lake which was established in 1955 and operated until 1981 (Mr. Watts, Canada Department of Transport, Edmonton, AB, personal communication). Sport fishing by the operating personnel is believed to have been minimal. There was little other sport fishing activity until 1979. In 1979 Echo Bay Mines Ltd. acquired property located in the northwest end of the lake and

started drilling work to verify gold deposits. In 1980 construction of Lupin mine commenced and the mine was in full scale operation by the spring of 1982. Recreational fishing by mine personnel occurred throughout the period of mine development since 1979, however the extent is unknown.

METHODS AND MATERIALS

Contwoyto Lake was surveyed over a period of two years, 1981-82. In 1981, the northern part of the lake was surveyed from 15 July to 24 August. The survey was conducted on the southern part of the lake in 1982 from 30 July to 21 August. The 1982 survey commenced later than in 1981 due to the late ice thaw on the lake.

EXPERIMENTAL GILLNETTING

Experimental gillnetting was carried out using standard gangs composed of 50 m lengths each of 38, 64, 89, 114 and 139 mm mesh (stretched measure) nylon gillnets. Set locations are depicted in Fig. 2. The average set duration was 27 h (Appendix 1). Catches were recorded by site number, mesh size and species. Large, active and unharmed lake trout and Arctic charr caught in the nets were measured for fork length (±1 mm), tagged and released. All other fish caught were sampled for biological analysis.

Scientific names of all fish species caught followed Scott and Crossman (1973): lake trout, Salvelinus namaycush (Walbaum); Arctic charr, Salvelinus alpinus (Linnaeus); round whitefish, Prosopium cylindraceum (Pallas); lake cisco, Coregonus artedii Lesueur; Arctic grayling, Thymallus arcticus (Pallas); and burbot, Lota lota (Linnaeus).

TAGGING

Lake trout and Arctic charr were captured for tagging by the use of small mesh gillnets and by angling. Monofilament gillnets used in 1981 and 1982 were composed of varying lengths of 38 mm and 64 mm mesh (stretched measure) (Appendix 1). Nets were checked at least once every 24 h weather permitting.

All the Arctic charr and lake trout in good condition were removed, placed in a restraining trough, measured for fork length (±1 mm) and tagged. Fish were tagged with floy (spaghetti) tags on the left side under the posterior portion of the dorsal fin such that the tag was anchored between the pterygiophores. The tag, stamped with an identifying number and return address, was inserted using a Denison model FDM-68 tagging gun. After tagging the fish was placed in the water beside the boat and held until it recovered. People at the mine and Inuit in the area were informed of our tagging activities. Only trout and Arctic charr considered to be in good condition were tagged. All other trout, charr and fish species caught were sampled for biological analysis.

BIOLOGICAL ANALYSIS

All fish taken from the experimental gillnets, except for those lake trout and Arctic charr that were tagged, were sampled for fork length (±1 mm), round weight (±50 g), aging structures (otoliths/scales), sex and stage of maturity. Sex and the relative stage of maturity were determined by examination of the gonads and coded according to the stages described in Appendix 2.

Sagittal otoliths were removed from lake trout, Arctic charr and burbot and stored dry in coin envelopes. In the laboratory, the convex surface of the otolith was selectively ground down on a carborundum stone and then placed in a cleansing solution of 3:1 benzyl benzoate and methyl salicylate. With the aid of a binocular dissecting microscope (x30) and using reflected light against a dark background the ages were determined by counting the annual growth rings. Scales were taken from Arctic grayling, round whitefish and lake cisco as described by Hatfield et al. (1972) and stored in scale envelopes. In the laboratory, scales were placed between two glass slides and aged by interpreting the annual growth rings on the image produced by an Eberbach microprojector (x40).

Ovaries were removed from mature lake trout sampled during the course of the survey and placed in a 10% formalin solution. In the laboratory, the ovaries were rinsed in water and the total number of ova from each ovary were counted after the removal of the ovarian tissue. Mean ovum diameter was calculated from 20 ova taken from each of the anterior, middle and posterior portions of both ovaries (n=120).

DATA ANALYSIS

Data were analyzed using an Amdahl 5850 computer. The Statistical Analysis System (1982) was used to generate length, weight, age, sex and maturity summaries and to perform basic calculations and statistical analysis.

Weight-length relationships were calculated using least squares regression analysis on logarithmic transformations of fork length and round weights. The relationship is described by the following equation:

$$\text{Log}_{10}\ W = a + b\ (\text{Log}_{10}\ L)$$

where W = weight in grams
L = fork length in millimeters.

Relative condition factor (K), a measure of the plumpness of a fish, was determined using the formula:

$$K = \frac{W \times 10^5}{L^3}$$

where W = weight in grams
L = fork length in millimeters.

Instantaneous total mortality (Z) was calculated from the least squares regression line

fitted to the descending limb of catch curves. Catch curves were fitted by eye and only that portion of the curve that appeared linear was included in the analysis. Moderate fluctuations in recruitment in different year classes tend to create an irregular shaped catch curve (Ricker 1975). To reduce these irregularities from unstable recruitment samples from successive years were combined (Ricker 1975). Smooth catch curves were therefore obtained using a running average of three years. Ricker (1975) indicated that the modal age in the catch curve will commonly lie close to the first year in which recruitment can be considered effectively complete. Therefore only the next older and subsequent age groups from the modal age were used.

RESULTS

CATCH AND EFFORT STATISTICS

Forty-one experimental gillnet sets were made in Contwoyto Lake: 21 sets from 21 July to 24 August 1981 and 20 sets from 31 July to 18 August 1982 (Fig. 2). A total of 826 fish were caught. The catch (in percent numbers) consisted of 63% lake trout, 31% lake cisco, 4% round whitefish, 3% Arctic charr and <0.1% Arctic grayling (Table 1). The catch composition varied between the north and south sections of the lake, however lake trout was the predominant (in percent numbers) species occurring in Contwoyto Lake.

Overall catch per unit effort (CPE) was 6.8 fish/100 m gillnet/24 h (Table 1) ranging from 0.4 to 54.2 (Appendix 1). CPE for lake trout was 4.2 fish/100 m gillnet/24 h: 2.8 in the northern section of the lake (1981) and 6.2 in the southern section of the lake (1982). CPE for lake cisco was 2.1 fish/100 m gillnet/24 h while CPE for all other species was <1.0.

BIOLOGICAL ANALYSIS

Lake trout

Mean length of lake trout caught by the experimental gillnets was 525 mm (range = 100-1007 mm) (Table 2): 551 mm (range = 100-1007 mm) in the northern section of the lake (Table 3) and 508 mm (range = 170-973 mm) in the southern section of the lake (Table 4). Length-frequency histograms show a bimodal distribution for lake trout at length interval 175-199 mm and 575-599 mm (Fig. 3). A bimodal distribution is also shown for both the northern and southern sections of the lake.

Mean age of lake trout from Contwoyto Lake was 22.3 yr (range = 5-62 yr) (Table 5): 24.4 yr (range = 6-49 yr) in the northern section of the lake (Table 6) and 21.0 yr (range = 5-62 yr) in the southern section (Table 7). The modal age is 7 yr for Contwoyto Lake lake trout but 22 yrs and 7 yrs for lake trout from the northern and southern sections of the lake respectively (Fig. 4).

The weight-length relationship is given in Table 9. Growth rate for lake trout from Contwoyto Lake is compared with that of lake trout from other lakes in the Northwest Territories (Fig. 5). The mean condition factor (K) was 1.17 for males and 1.07 for females (Table 2).

Males were completely mature by the 550-574 mm length interval (Table 2) and age 25 yr (Table 5) while females were completely mature by the 600-624 mm length interval (Table 2) and age 24 yr (Table 5). The average fecundity of 36 lake trout from Contwoyto Lake was 4 227 ova per fish (range = 1 645 ova to 8 949 ova) (Table 10).

Catch curve analysis indicated a good fit to the regression line fitted to that portion of the descending limb of the curve considered, by visual observation, to be linear (Fig. 6). Instantaneous total mortality (Z), calculated from the slope of the straight line fitted to the data, was estimated to be 0.29. Annual survival rate (S) was 0.75.

One hundred and sixty-one lake trout were tagged and the mean length was 680 mm (Table 8). In addition, 363 lake trout caught by tagging nets were sampled (Appendix 3).

Arctic charr

Mean length of Arctic charr caught by the experimental gillnets was 400 mm (range = 180-655 mm) and mean weight was 1 294 g (Table 11). Mean age was 12.0 yr (range = 6-20 yr) (Table 12). The weight-length relationship is given in Table 9. Mean condition factor (K) was 1.14 (Table 11). Instantaneous total mortality (Z) was estimated to be 0.18 (Fig. 6). Annual survival rate (S) was 0.84.

Six Arctic charr were tagged and the mean length was 609 mm (Table 13). In addition, 46 Arctic charr caught by tagging nets were sampled (Appendix 5).

Round whitefish

Mean length of round whitefish caught by the experimental gillnets was 341 mm (range = 187-404 mm) and mean weight was 435 g (Table 14). Mean age was 8.5 yr (range = 3-12 yr) (Table 15). The weight-length relationship is given in Table 9. Mean condition factor (K) was 1.04 (Table 14).

Nine round whitefish caught by tagging nets were sampled (Appendix 7).

Lake cisco

Mean length of lake cisco caught by the experimental gillnets was 258 mm (range = 150-358 mm) and mean weight was 262 g (Table 16). Mean age was 5.4 yr (range = 2-11 yr) (Table 17). The weight-length relationship is given in Table 9. Mean condition factor (K) was 1.18 (Table 16).

Arctic grayling

Only one Arctic grayling was caught by the experimental gillnets with a fork length of 182 mm, a weight of 75 g and aged 2.0 yr.

Burbot

Two burbot were caught by tagging nets and sampled (Appendix 9).

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Table 1. Catch and catch per unit effort (CPE) data for fish caught by experimental gillnets from Contwoyto Lake, 1981 and 1982.

			Mesh Size (mm)					Total Catch	CPE[1]
			38	64	89	114	139		
1981	Lake trout	No.	78	58	24	27	15	202	2.8
		%	38.6	28.7	11.9	13.4	7.4	91.8	
	Arctic charr	No.	13	1	3	-	-	17	0.2
		%	76.5	5.9	17.6	-	-	7.7	
	Round whitefish	No.	1	-	-	-	-	1	<0.1
		%	100.0	-	-	-	-	<0.1	
	Total	No.	92	59	27	27	15	220	3.1
		%	41.8	26.8	12.3	12.3	6.8		
1982	Lake trout	No.	124	81	47	33	30	315	6.2
		%	39.4	25.7	14.9	10.5	9.5	52.0	
	Arctic charr	No.	6	1	-	-	-	7	0.1
		%	85.7	14.3	-	-	-	1.2	
	Round whitefish	No.	4	24	1	-	-	29	0.6
		%	13.8	82.8	3.5	-	-	4.8	
	Lake cisco	No.	136	104	11	2	1	254	5.0
		%	53.5	40.9	4.3	0.8	0.4	41.9	
	Arctic grayling	No.	1	-	-	-	-	1	<0.1
		%	100.0	-	-	-	-	<0.1	
	Total	No.	271	210	59	35	31	606	12.0
		%	44.7	34.7	9.7	5.8	5.1		
1981 & 1982	Lake trout	No.	202	139	71	60	45	517	4.2
		%	39.1	26.9	13.7	11.6	8.7	62.6	
	Arctic charr	No.	19	2	3	-	-	24	0.2
		%	79.2	8.3	12.5	-	-	2.9	
	Round whitefish	No.	5	24	1	-	-	30	0.3
		%	16.7	80.0	3.3	-	-	3.6	
	Lake cisco	No.	136	104	11	2	1	254	2.1
		%	53.5	40.9	4.3	0.8	0.4	30.8	
	Arctic grayling	No.	1	-	-	-	-	1	<0.1
		%	100.0	-	-	-	-	<0.1	
	Total	No.	363	269	86	62	46	826	6.8
		%	43.9	32.6	10.4	7.5	5.6		

[1] No. fish/100 m of gillnet/24 h.

Table 2. Biological data by length interval for lake trout caught by experimental gillnets from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	MALES						FEMALES						COMBINED					
		LENGTH(MM)	WEIGHT(G)			%		LENGTH(MM)	WEIGHT(G)			%		LENGTH(MM)	WEIGHT(G)			%
	N	MEAN	MEAN	SD	K	MAT	N	MEAN	MEAN	SD	K	MAT	N	MEAN	MEAN	SD	K	MAT
100	1	100	232	-	23.2	0	-	-	-	-	-	-	1	100	232	-	23.2	0
150	1	174	50	-	0.95	0	1	165	50	-	1.11	0	5	170	50	0	1.03	0
175	8	190	72	21	1.04	0	18	189	69	22	1.01	0	39	188	69	24	1.02	0
200	12	212	94	16	1.00	8	15	207	90	26	1.02	7	33	209	92	21	1.01	6
225	9	239	133	33	0.97	11	13	236	135	33	1.02	15	22	237	134	32	1.00	14
250	3	263	192	14	1.05	0	3	252	150	0	0.93	0	8	259	172	25	0.99	0
275	8	293	275	27	1.09	0	3	289	242	63	0.99	0	12	292	265	38	1.06	0
300	9	315	339	60	1.08	0	7	312	325	38	1.07	29	17	313	331	50	1.08	12
325	9	340	439	65	1.11	44	6	336	396	75	1.04	0	15	338	422	70	1.08	27
350	1	352	450	-	1.03	0	3	360	467	29	1.00	0	4	358	463	25	1.01	0
375	4	390	700	71	1.18	50	1	399	650	-	1.02	0	5	391	690	65	1.15	40
400	4	413	788	85	1.11	50	6	411	783	61	1.13	33	10	412	785	67	1.12	40
425	4	431	888	63	1.11	25	6	437	875	94	1.05	17	10	435	880	79	1.07	20
450	5	463	1080	91	1.09	100	7	463	1143	106	1.15	86	12	463	1117	101	1.13	92
475	7	486	1386	63	1.21	100	4	490	1588	250	1.35	100	11	487	1459	177	1.26	100
500	8	515	1606	150	1.17	100	7	518	1514	135	1.09	86	15	517	1563	146	1.13	93
525	15	537	1903	426	1.23	93	13	538	1727	120	1.11	100	28	538	1821	329	1.17	96
550	18	566	2128	218	1.18	100	9	562	2072	272	1.17	100	27	564	2109	233	1.17	100
575	23	585	2267	187	1.13	100	13	587	2265	200	1.12	92	36	586	2267	189	1.13	97
600	15	613	2643	234	1.15	100	11	612	2695	286	1.17	100	26	613	2665	253	1.16	100
625	11	639	2736	410	1.04	100	7	635	2971	328	1.16	100	18	638	2828	388	1.09	100
650	15	662	2947	524	1.02	100	15	659	3073	407	1.08	100	30	660	3010	466	1.05	100
675	11	689	3523	299	1.08	100	9	688	3444	432	1.06	100	20	688	3488	357	1.07	100
700	10	710	3270	841	0.91	100	7	707	3621	514	1.02	100	17	709	3415	727	0.96	100
725	9	739	4611	459	1.14	100	7	734	3871	428	0.98	100	16	737	4288	574	1.07	100
750	8	760	4663	677	1.06	100	10	761	4765	708	1.08	100	18	761	4719	676	1.07	100
775	6	792	4633	847	0.93	100	5	785	4780	718	0.98	100	11	789	4700	756	0.95	100
800	6	813	5175	877	0.97	100	9	810	5617	676	1.05	100	15	811	5440	766	1.02	100
825	7	833	5857	1344	1.01	100	6	840	6083	452	1.03	100	13	836	5962	1001	1.02	100
850	1	872	7450	-	1.12	100	5	863	6340	940	0.98	100	6	865	6525	955	1.01	100
875	5	885	7010	540	1.01	100	4	889	6988	1146	0.99	100	9	887	7000	799	1.00	100
900	1	919	8050	-	1.04	100	3	905	8667	1793	1.17	100	5	908	8513	1496	1.13	80
925	-	-	-	-	-	-	2	940	9025	1874	1.09	100	2	940	9025	1874	1.09	100
950	-	-	-	-	-	-	3	965	9950	2663	1.10	100	4	964	9950	2663	1.10	75
1000	-	-	-	-	-	-	-	-	-	-	-	-	2	1007	-	-	-	0
TOTAL	254						238						522[a]					
MEAN		542	2301	1806	1.17			535	2478	2340	1.07			525	2272	2089	1.12	

[a] Includes fish tagged and released.

Table 3. Biological data by length interval for lake trout caught by experimental gillnets from Contwoyto Lake, 1981.

LENGTH INTERVAL (MM)	MALES						FEMALES						COMBINED					
		LENGTH(MM)	WEIGHT(G)			%		LENGTH(MM)	WEIGHT(G)			%		LENGTH(MM)	WEIGHT(G)			%
	N	MEAN	MEAN	SD	K	MAT	N	MEAN	MEAN	SD	K	MAT	N	MEAN	MEAN	SD	K	MAT
100	1	100	232	-	23.2	0	-	-	-	-	-	-	1	100	232	-	23.2	0
150	-	-	-	-	-	-	1	165	50	-	1.11	0	2	169	50	0	1.05	0
175	1	185	50	-	0.79	0	7	188	71	27	1.05	0	12	186	67	25	1.01	0
200	4	210	100	0	1.09	0	6	209	83	26	0.92	17	14	208	89	21	1.00	7
225	1	240	100	-	0.72	0	4	234	138	48	1.06	25	5	235	130	45	0.99	20
250	1	260	200	-	1.14	0	-	-	-	-	-	-	1	260	200	-	1.14	0
275	2	295	275	35	1.07	0	-	-	-	-	-	-	3	292	267	29	1.06	0
300	4	320	350	82	1.06	0	2	313	300	0	0.99	50	6	318	333	68	1.04	17
325	3	338	400	50	1.03	0	2	333	400	141	1.07	0	5	336	400	79	1.05	0
350	1	352	450	-	1.03	0	1	353	450	-	1.02	0	2	353	450	0	1.03	0
375	1	384	650	-	1.15	0	-	-	-	-	-	-	1	384	650	-	1.15	0
400	2	411	800	141	1.15	0	3	412	767	76	1.09	0	5	412	780	91	1.11	0
425	3	427	867	58	1.11	0	3	438	883	126	1.05	0	6	433	875	88	1.08	0
450	-	-	-	-	-	-	4	464	1188	111	1.19	75	4	464	1188	111	1.19	75
475	1	495	1450	-	1.20	100	-	-	-	-	-	-	1	495	1450	-	1.20	100
500	1	519	1800	-	1.29	100	3	519	1483	58	1.06	100	4	519	1563	165	1.12	100
525	6	535	1924	692	1.26	83	4	535	1638	125	1.07	100	10	535	1810	542	1.18	90
550	9	569	2178	244	1.18	100	4	559	2088	368	1.20	100	13	566	2150	275	1.19	100
575	10	582	2240	212	1.13	100	4	584	2338	301	1.17	75	14	583	2268	233	1.14	93
600	8	617	2638	286	1.12	100	4	613	2800	337	1.22	100	12	615	2692	299	1.15	100
625	7	641	2814	461	1.06	100	3	633	2933	501	1.15	100	10	639	2850	448	1.09	100
650	4	663	3188	602	1.10	100	3	653	2983	189	1.07	100	7	659	3100	453	1.09	100
675	6	686	3433	227	1.07	100	4	687	3350	227	1.03	100	10	686	3400	219	1.05	100
700	2	707	3050	990	0.86	100	3	712	3750	180	1.04	100	5	710	3470	639	0.97	100
725	8	740	4725	328	1.17	100	4	731	3788	328	0.97	100	12	737	4413	558	1.10	100
750	1	771	4400	-	0.96	100	4	758	4838	1042	1.11	100	5	760	4750	923	1.08	100
775	2	796	4950	141	0.98	100	2	785	5025	813	1.04	100	4	790	4988	478	1.01	100
800	3	815	4783	1010	0.89	100	3	818	5700	984	1.04	100	6	816	5242	1023	0.96	100
825	4	835	5688	1593	0.98	100	3	839	6250	377	1.06	100	7	836	5929	1186	1.01	100
850	1	872	7450	-	1.12	100	-	-	-	-	-	-	1	872	7450	-	1.12	100
875	2	878	6675	601	0.99	100	2	889	7900	495	1.13	100	4	883	7288	838	1.06	100
900	-	-	-	-	-	-	2	908	8100	2121	1.08	100	3	906	8100	2121	1.08	67
925	-	-	-	-	-	-	1	935	10350	-	1.27	100	1	935	10350	-	1.27	100
950	-	-	-	-	-	-	2	961	8550	1556	0.96	100	3	961	8550	1556	0.96	67
1000	-	-	-	-	-	-	-	-	-	-	-	-	2	1007	-	-	-	0
TOTAL	99						88						201[a]					
MEAN		574	2591	1780	1.32			547	2674	2515	1.07			551	2501	2169	1.19	

[a] Includes fish tagged and released.

Table 4. Biological data by length interval for lake trout caught by experimental gillnets from Contwoyto Lake, 1982.

LENGTH INTERVAL (MM)	MALES						FEMALES						COMBINED					
		LENGTH(MM)	WEIGHT(G)			%		LENGTH(MM)	WEIGHT(G)			%		LENGTH(MM)	WEIGHT(G)			%
	N	MEAN	MEAN	SD	K	MAT	N	MEAN	MEAN	SD	K	MAT	N	MEAN	MEAN	SD	K	MAT
150	1	174	50	-	0.95	0	-	-	-	-	-	-	3	170	50	0	1.02	0
175	7	191	75	20	1.08	0	11	190	68	20	0.99	0	27	188	69	24	1.03	0
200	8	212	91	19	0.96	13	9	206	94	27	1.09	0	19	210	93	22	1.02	5
225	8	239	138	33	1.00	13	9	236	133	28	1.00	11	17	238	135	29	1.00	12
250	2	265	188	18	1.01	0	3	252	150	0	0.93	0	7	259	168	24	0.97	0
275	6	292	275	27	1.10	0	3	289	242	63	0.99	0	9	291	264	42	1.06	0
300	5	311	330	45	1.10	0	5	312	335	42	1.10	20	11	311	330	40	1.10	9
325	6	341	458	66	1.16	67	4	337	394	52	1.02	0	10	339	433	67	1.10	40
350	-	-	-	-	-	-	2	363	475	35	0.99	0	2	363	475	35	0.99	0
375	3	391	717	76	1.19	67	1	399	650	-	1.02	0	4	393	700	71	1.15	50
400	2	416	775	35	1.08	100	3	410	800	50	1.16	67	5	412	790	42	1.13	80
425	1	441	950	-	1.11	100	3	436	867	76	1.05	33	4	437	888	75	1.06	50
450	5	463	1080	91	1.09	100	3	461	1083	76	1.10	100	8	462	1081	80	1.09	100
475	6	485	1375	61	1.21	100	4	490	1588	250	1.35	100	10	487	1460	187	1.27	100
500	7	515	1579	138	1.15	100	4	518	1538	180	1.11	75	11	516	1564	147	1.14	91
525	9	539	1889	132	1.21	100	9	540	1767	100	1.12	100	18	539	1828	130	1.17	100
550	9	562	2078	189	1.17	100	5	565	2060	213	1.14	100	14	563	2071	190	1.16	100
575	13	587	2288	172	1.13	100	9	589	2233	150	1.09	100	22	588	2266	162	1.12	100
600	7	610	2650	178	1.17	100	7	612	2636	261	1.15	100	14	611	2643	215	1.16	100
625	4	636	2600	311	1.01	100	4	637	3000	212	1.16	100	8	636	2800	326	1.09	100
650	11	662	2859	494	0.99	100	12	660	3096	449	1.08	100	23	661	2983	476	1.04	100
675	5	693	3630	365	1.09	100	5	688	3520	564	1.07	100	10	691	3575	452	1.08	100
700	8	711	3325	868	0.92	100	4	704	3525	691	1.01	100	12	709	3392	787	0.95	100
725	1	725	3700	-	0.97	100	3	738	3983	597	0.99	100	4	735	3913	507	0.98	100
750	7	759	4700	722	1.08	100	6	763	4717	495	1.06	100	13	761	4708	602	1.07	100
775	4	791	4475	1044	0.90	100	3	786	4617	775	0.95	100	7	789	4536	866	0.92	100
800	3	811	5567	666	1.05	100	6	807	5575	581	1.06	100	9	808	5572	567	1.06	100
825	3	830	6083	1217	1.06	100	3	840	5917	535	1.00	100	6	835	6000	846	1.03	100
850	-	-	-	-	-	-	5	863	6340	940	0.98	100	5	863	6340	940	0.98	100
875	3	890	7233	465	1.03	100	2	890	6075	601	0.86	100	5	890	6770	775	0.96	100
900	1	919	8050	-	1.04	100	1	901	9800	-	1.34	100	2	910	8925	1237	1.19	100
925	-	-	-	-	-	-	1	944	7700	-	0.92	100	1	944	7700	-	0.92	100
950	-	-	-	-	-	-	1	973	12750	-	1.38	100	1	973	12750	-	1.38	100
TOTAL	155						150						321[a]					
MEAN		521	2116	1804	1.08			527	2364	2231	1.07			508	2131	2029	1.07	

[a] Includes fish tagged and released.

Table 5. Biological data by age group for lake trout caught by experimental gillnets from Contwoyto Lake, 1981-82.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
5	1	193	-	50	-	0.70	0	1	206	-	75	-	0.86	0	2	200	9.2	63	18	0.78	0
6	3	180	5.3	58	14	1.00	0	13	199	12.7	87	30	1.07	0	24	190	14.8	71	28	1.00	0
7	14	201	33.5	106	51	2.62	0	15	207	26.9	87	38	0.94	0	39	203	28.4	93	43	1.57	0
8	9	248	19.9	144	54	0.91	0	8	230	31.1	119	48	0.93	0	20	236	30.3	130	54	0.94	0
9	6	242	42.0	167	88	1.10	0	3	209	36.2	100	50	1.03	0	10	228	39.6	140	77	1.08	0
10	8	296	35.3	294	90	1.09	13	5	248	53.5	180	135	1.01	0	15	274	50.1	243	118	1.08	8
11	6	370	78.8	642	489	1.12	50	5	268	56.6	220	115	1.07	0	11	324	84.9	450	417	1.10	27
12	3	345	46.1	483	176	1.14	33	6	373	44.8	558	215	1.04	17	9	364	44.4	533	195	1.07	22
13	9	341	76.1	483	300	1.09	44	11	347	76.8	534	357	1.10	27	20	345	74.5	511	325	1.10	35
14	8	395	85.1	794	548	1.11	50	9	386	89.2	717	458	1.08	44	17	390	84.6	753	488	1.09	47
15	7	428	65.9	964	437	1.14	71	8	452	108.1	1194	620	1.12	75	15	441	88.6	1087	537	1.13	73
16	5	491	69.3	1460	559	1.17	80	8	500	41.3	1388	396	1.08	88	13	497	51.1	1415	444	1.12	85
17	7	509	60.2	1550	486	1.14	86	4	495	60.0	1475	492	1.19	100	11	504	57.5	1523	465	1.16	91
18	13	564	47.5	2054	482	1.13	100	5	534	63.1	1810	637	1.15	80	18	555	52.2	1986	522	1.13	94
19	2	542	50.2	1750	566	1.08	100	6	518	34.3	1550	326	1.10	83	8	524	36.4	1600	361	1.10	88
20	7	568	89.7	2293	1096	1.19	100	5	660	63.6	3120	740	1.08	100	12	606	90.1	2638	1018	1.14	100
21	7	524	73.6	1743	662	1.16	71	4	593	46.3	2500	821	1.16	100	11	549	71.5	2018	781	1.16	82
22	10	607	54.1	2670	663	1.19	90	6	662	85.2	3517	1322	1.19	100	16	628	70.3	2988	1013	1.19	94
23	8	616	58.9	2487	797	1.04	100	7	607	95.2	2786	1565	1.17	86	15	612	75.1	2626	1179	1.10	93
24	9	567	70.7	2228	869	1.17	89	4	596	42.3	2225	386	1.06	100	13	576	63.0	2227	735	1.13	92
25	4	618	97.3	2813	1232	1.15	100	5	708	83.8	3850	1234	1.06	100	9	668	96.6	3389	1276	1.10	100
26	2	634	90.5	2600	919	1.00	100	8	682	63.0	3463	1072	1.07	100	10	672	66.4	3290	1059	1.05	100
27	7	637	87.6	2957	1374	1.09	100	7	685	82.1	3614	1240	1.08	100	14	661	85.2	3286	1302	1.09	100
28	4	661	84.1	3350	1373	1.11	100	7	641	66.9	3136	960	1.16	100	11	648	70.0	3214	1063	1.14	100
29	6	596	49.1	2583	478	1.22	100	9	712	104.7	4344	1691	1.16	100	15	666	102.9	3640	1585	1.19	100
30	6	676	71.3	3392	988	1.08	100	3	646	99.9	3067	1418	1.09	100	9	666	76.8	3283	1067	1.08	100
31	3	637	39.3	2983	643	1.14	100	3	698	177.8	3883	2363	1.10	100	6	668	119.8	3433	1626	1.12	100
32	7	719	99.7	4550	1823	1.17	100	2	787	19.8	5000	778	1.02	100	9	734	91.7	4650	1614	1.13	100
33	7	752	130.4	4829	2044	1.09	100	7	724	147.1	4529	2903	1.06	100	14	738	134.3	4679	2417	1.08	100
34	7	668	88.1	3300	1301	1.07	100	1	690	-	3650	-	1.11	100	8	671	82.0	3344	1211	1.08	100
35	1	710	-	2000	-	0.56	100	1	957	-	7450	-	0.85	100	2	834	174.7	4725	3854	0.70	100
36	8	669	101.6	3444	1770	1.10	100	6	746	88.3	4350	2061	0.99	100	14	702	100.5	3832	1881	1.05	100
37	8	727	116.6	4106	2116	1.02	100	4	740	133.6	4538	2299	1.05	100	12	731	116.5	4250	2082	1.03	100
38	6	706	99.5	3692	1721	1.01	100	2	769	92.6	4375	1520	0.94	100	8	721	95.6	3863	1596	0.99	100
39	7	751	69.1	4043	1037	0.94	100	2	739	53.0	3825	884	0.94	100	9	748	63.0	3994	956	0.94	100
40	1	774	-	3900	-	0.84	100	5	782	70.9	4650	1214	0.96	100	6	780	63.5	4525	1128	0.94	100
41	4	758	96.9	4900	1938	1.08	100	4	772	83.1	4625	1971	0.97	100	8	765	83.8	4763	1815	1.03	100
42	6	714	60.0	3808	1304	1.02	100	5	821	60.1	6120	1576	1.08	100	11	763	79.8	4859	1817	1.05	100
43	3	792	36.5	4250	638	0.86	100	2	861	72.1	7575	2864	1.15	100	5	819	58.4	5580	2360	0.98	100
44	1	830	-	3400	-	0.59	100	4	784	181.2	5888	3799	1.09	100	5	793	158.3	5390	3473	0.99	100
45	3	773	93.5	4983	2769	0.98	100	2	843	26.9	5175	530	0.86	100	5	801	77.7	5060	1978	0.93	100
46	2	608	109.6	3050	495	1.44	100	2	853	170.4	8025	6682	1.11	100	4	730	183.6	5538	4818	1.27	100
47	1	730	-	5450	-	1.40	100	2	879	120.9	7625	2864	1.10	100	3	829	121.1	6900	2383	1.20	100
48	-	-	-	-	-	-	-	1	883	-	5650	-	0.82	100	1	883	-	5650	-	0.82	100
49	1	876	-	7100	-	1.06	100	-	-	-	-	-	-	-	1	876	-	7100	-	1.06	100
50	1	725	-	3700	-	0.97	100	-	-	-	-	-	-	-	1	725	-	3700	-	0.97	100
52	1	700	-	3700	-	1.08	100	-	-	-	-	-	-	-	1	700	-	3700	-	1.08	100
62	1	783	-	3800	-	0.79	100	-	-	-	-	-	-	-	1	783	-	3800	-	0.79	100
TOTAL	250							227							501						
MEAN		543	191	2306	1805	1.17			536	226.0	2499	2374	1.07			523	215.8	2288	2103	1.12	
MEAN AGE	22.3																				

Table 8. Biological data by age group for lake trout caught by experimental gillnets from Contwoyto Lake, 1981.

AGE (YR)	MALES							FEMALES							COMBINED						
	LENGTH(MM)			WEIGHT(G)			%	LENGTH(MM)			WEIGHT(G)			%	LENGTH(MM)			WEIGHT(G)			%
	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT
6	-	-	-	-	-	-	-	2	201	7.8	75	35	0.91	0	3	195	10.5	67	29	0.87	0
7	3	166	59.2	127	94	8.34	0	3	193	32.1	67	29	0.91	0	9	181	36.7	81	61	3.36	0
8	2	231	12.7	100	0	0.82	0	2	190	21.2	50	0	0.76	0	6	203	25.5	75	27	0.89	0
9	2	203	0.7	100	0	1.20	0	2	190	21.2	75	35	1.05	0	5	198	13.2	90	22	1.13	0
10	1	322	-	350	-	1.05	0	2	202	11.3	75	35	0.95	0	4	230	62.2	150	135	1.09	0
11	-	-	-	-	-	-	-	2	209	24.0	100	0	1.14	0	2	209	24.0	100	0	1.14	0
12	1	298	-	300	-	1.13	0	1	421	-	850	-	1.14	0	2	360	87.0	575	389	1.14	0
13	4	330	69.0	425	272	1.08	0	5	351	98.6	590	464	1.12	20	9	342	82.2	517	378	1.10	11
14	4	322	22.4	350	82	1.04	0	6	353	84.9	558	414	1.07	50	10	341	66.6	475	330	1.06	30
15	3	396	86.2	767	592	1.08	33	3	388	163.1	867	862	1.05	67	6	392	116.7	817	664	1.07	50
16	3	491	96.1	1500	747	1.18	67	2	480	62.9	1150	566	0.99	50	5	486	75.2	1360	629	1.11	60
17	1	402	-	700	-	1.08	0	1	534	-	1650	-	1.08	100	2	468	93.3	1175	672	1.08	50
18	3	558	30.0	1967	351	1.13	100	4	522	66.5	1763	725	1.18	75	7	537	53.6	1850	562	1.16	86
19	1	577	-	2150	-	1.12	100	1	465	-	1050	-	1.04	100	2	521	79.2	1600	778	1.08	100
20	2	677	86.3	3550	1344	1.12	100	2	714	51.6	3700	707	1.01	100	4	695	61.7	3625	881	1.06	100
21	4	503	85.8	1500	694	1.12	50	2	589	77.8	2500	1414	1.15	100	6	532	87.2	1833	978	1.13	67
22	7	591	41.5	2479	574	1.20	86	4	671	105.8	3713	1662	1.19	100	11	620	77.6	2927	1189	1.20	91
23	4	648	69.4	2649	1116	0.92	100	2	566	17.0	2150	141	1.19	50	6	620	68.7	2483	905	1.01	83
24	4	527	73.3	1738	562	1.16	75	1	565	-	1650	-	0.91	100	5	534	65.8	1720	488	1.11	80
25	1	745	-	4500	-	1.09	100	1	742	-	4200	-	1.03	100	2	744	2.1	4350	212	1.06	100
26	1	570	-	1950	-	1.05	100	2	734	26.9	3900	283	0.99	100	3	679	96.6	3250	1143	1.01	100
27	2	611	49.5	2450	636	1.06	100	2	592	89.8	2225	884	1.05	100	4	601	60.3	2338	642	1.06	100
28	3	687	79.9	3817	1233	1.15	100	3	665	53.7	3267	551	1.11	100	6	676	62.0	3542	906	1.13	100
29	2	571	0.7	2425	318	1.31	100	3	696	63.2	4283	1922	1.21	100	5	646	81.8	3540	1705	1.25	100
30	6	676	71.3	3392	988	1.08	100	1	581	-	2350	-	1.20	100	7	663	74.4	3243	984	1.10	100
31	-	-	-	-	-	-	-	2	748	219.2	4675	2722	1.11	100	2	748	219.2	4675	2722	1.11	100
32	6	699	91.9	4075	1446	1.15	100	-	-	-	-	-	-	-	6	699	91.9	4075	1446	1.15	100
33	3	663	136.9	3517	1892	1.16	100	1	518	-	1450	-	1.04	100	4	627	133.2	3000	1859	1.13	100
34	2	614	49.5	2575	601	1.10	100	1	690	-	3650	-	1.11	100	3	639	56.1	2933	752	1.11	100
35	-	-	-	-	-	-	-	1	957	-	7450	-	0.85	100	1	957	-	7450	-	0.85	100
36	5	697	109.9	3740	2146	1.04	100	2	833	87.7	6475	2510	1.09	100	7	736	117.2	4521	2429	1.05	100
37	6	698	102.9	3800	1470	1.09	100	1	839	-	6650	-	1.13	100	7	718	108.0	4207	1721	1.09	100
38	2	740	134.4	4250	2687	0.97	100	-	-	-	-	-	-	-	2	740	134.4	4250	2687	0.97	100
39	2	783	16.3	4625	318	0.96	100	1	776	-	4450	-	0.95	100	3	780	12.1	4567	247	0.96	100
40	-	-	-	-	-	-	-	2	709	29.0	3350	283	0.94	100	2	709	29.0	3350	283	0.94	100
41	-	-	-	-	-	-	-	3	767	101.1	4817	2368	1.01	100	3	767	101.1	4817	2368	1.01	100
42	2	669	29.0	3300	424	1.12	100	3	796	68.1	5417	1630	1.05	100	5	745	85.9	4570	1648	1.08	100
43	2	813	7.8	4325	884	0.81	100	2	861	72.1	7575	2864	1.15	100	4	837	50.4	5950	2552	0.98	100
44	1	830	-	3400	-	0.59	100	3	730	179.3	5283	4411	1.15	100	4	755	154.6	4813	3723	1.01	100
45	1	848	-	7100	-	1.16	100	1	824	-	4800	-	0.86	100	2	836	17.0	5950	1626	1.01	100
46	1	530	-	2700	-	1.81	100	-	-	-	-	-	-	-	1	530	-	2700	-	1.81	100
47	1	730	-	5450	-	1.40	100	2	879	120.9	7625	2864	1.10	100	3	829	121.1	6900	2383	1.20	100
49	1	876	-	7100	-	1.06	100	-	-	-	-	-	-	-	1	876	-	7100	-	1.06	100
TOTAL	99							84							191						
MEAN		574	180	2591	1780	1.32			555	230.0	2760	2537	1.07			550	213.7	2559	2174	1.19	
MEAN AGE	24.4																				

Table 7. Biological data by age group for lake trout caught by experimental gillnets from Contwoyto Lake, 1982.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
5	1	193	-	50	-	0.70	0	1	206	-	75	-	0.86	0	2	200	9.2	63	18	0.78	0
6	3	180	5.3	58	14	1.00	0	11	199	13.7	89	30	1.10	0	21	189	15.4	71	29	1.02	0
7	11	211	17.3	100	39	1.05	0	12	210	25.8	92	39	0.95	0	30	210	22.3	97	38	1.03	0
8	7	253	19.3	157	55	0.93	0	6	244	20.1	142	26	0.99	0	14	250	19.4	154	44	0.96	0
9	4	261	37.5	200	91	1.05	0	1	247	-	150	-	1.00	0	5	258	33.1	190	82	1.04	0
10	7	293	36.5	286	94	1.09	14	3	279	46.1	250	132	1.05	0	11	290	35.8	277	96	1.08	10
11	6	370	78.8	642	489	1.12	50	3	308	16.8	300	50	1.02	0	9	349	70.1	528	424	1.09	33
12	2	369	29.7	575	106	1.14	50	5	363	42.5	500	179	1.02	20	7	365	36.9	521	157	1.05	29
13	5	350	88.3	530	344	1.09	80	6	344	63.2	488	276	1.09	33	11	347	71.6	507	293	1.09	55
4	4	468	47.1	1238	411	1.18	100	3	451	64.2	1033	431	1.08	33	7	461	50.6	1150	398	1.14	71
15	4	453	43.5	1113	281	1.19	100	5	489	48.8	1390	416	1.17	80	9	473	47.7	1267	371	1.18	89
16	2	492	27.6	1400	354	1.17	100	6	507	37.0	1467	354	1.11	100	8	503	33.7	1450	330	1.12	100
17	6	527	40.9	1692	340	1.15	100	3	481	66.0	1417	586	1.23	100	9	512	51.5	1600	421	1.17	100
18	10	565	52.9	2080	528	1.13	100	1	580	-	2000	-	1.03	100	11	567	50.4	2073	502	1.12	100
19	1	506	-	1350	-	1.04	100	5	528	25.2	1650	240	1.11	80	6	525	24.3	1600	247	1.10	83
20	5	524	43.0	1790	495	1.22	100	3	624	44.2	2733	535	1.12	100	8	562	65.5	2144	678	1.18	100
21	3	553	55.4	2067	562	1.20	100	2	598	17.7	2500	141	1.17	100	5	571	47.1	2240	468	1.19	100
22	3	644	70.7	3117	751	1.16	100	2	646	43.1	3125	35	1.18	100	5	645	54.4	3120	531	1.17	100
23	4	584	24.5	2325	405	1.16	100	5	623	111.2	3040	1840	1.16	100	9	606	82.6	2722	1377	1.16	100
24	5	600	54.7	2620	916	1.18	100	3	607	45.1	2417	58	1.10	100	8	603	48.0	2544	701	1.15	100
25	3	575	58.0	2250	614	1.17	100	4	700	94.2	3763	1407	1.06	100	7	646	99.9	3114	1330	1.11	100
26	1	698	-	3250	-	0.96	100	6	665	63.0	3317	1221	1.09	100	7	669	58.9	3307	1115	1.07	100
27	5	647	102.0	3160	1597	1.10	100	5	722	44.9	4170	871	1.09	100	10	685	84.1	3665	1324	1.10	100
28	1	581	-	1950	-	0.99	100	4	623	77.4	3038	1270	1.20	100	5	614	69.6	2820	1202	1.16	100
29	4	609	58.1	2663	568	1.18	100	6	720	125.3	4375	1759	1.14	100	10	676	114.7	3690	1615	1.15	100
30	-	-	-	-	-	-	-	2	679	116.7	3425	1803	1.04	100	2	679	116.7	3425	1803	1.04	100
31	3	637	39.3	2983	643	1.14	100	1	597	-	2300	-	1.08	100	4	627	37.9	2813	626	1.12	100
32	1	841	-	7400	-	1.24	100	2	787	19.8	5000	778	1.02	100	3	805	34.2	5800	1491	1.10	100
33	4	820	86.0	5813	1719	1.03	100	6	759	126.6	5042	2810	1.07	100	10	783	111.2	5350	2352	1.05	100
34	5	690	94.7	3590	1442	1.06	100	-	-	-	-	-	-	-	5	690	94.7	3590	1442	1.06	100
35	1	710	-	2000	-	0.56	100	-	-	-	-	-	-	-	1	710	-	2000	-	0.56	100
36	3	623	82.8	2950	1083	1.18	100	4	703	53.6	3288	679	0.94	100	7	669	74.3	3143	809	1.05	100
37	2	813	149.9	5025	4278	0.80	100	3	707	142.2	3833	2225	1.02	100	5	749	138.3	4310	2734	0.94	100
38	4	688	96.4	3413	1490	1.03	100	2	769	92.6	4375	1520	0.94	100	6	715	94.9	3733	1429	1.00	100
39	5	738	80.0	3810	1162	0.93	100	1	701	-	3200	-	0.93	100	6	732	73.2	3708	1069	0.93	100
40	1	774	-	3900	-	0.84	100	3	830	26.8	5517	301	0.96	100	4	816	35.7	5113	845	0.93	100
41	4	758	96.9	4900	1938	1.08	100	1	785	-	4050	-	0.84	100	5	763	84.8	4730	1721	1.03	100
42	4	737	60.3	4063	1586	0.97	100	2	860	17.7	7175	955	1.13	100	6	778	79.0	5100	2067	1.02	100
43	1	750	-	4100	-	0.97	100	-	-	-	-	-	-	-	1	750	-	4100	-	0.97	100
44	-	-	-	-	-	-	-	1	944	-	7700	-	0.92	100	1	944	-	7700	-	0.92	100
45	2	735	94.8	3925	2934	0.89	100	1	862	-	5550	-	0.87	100	3	777	99.3	4467	2277	0.88	100
46	1	685	-	3400	-	1.06	100	2	853	170.4	8025	6682	1.11	100	3	797	154.5	6483	5427	1.09	100
48	-	-	-	-	-	-	-	1	883	-	5650	-	0.82	100	1	883	-	5650	-	0.82	100
50	1	725	-	3700	-	0.97	100	-	-	-	-	-	-	-	1	725	-	3700	-	0.97	100
52	1	700	-	3700	-	1.08	100	-	-	-	-	-	-	-	1	700	-	3700	-	1.08	100
62	1	783	-	3800	-	0.79	100	-	-	-	-	-	-	-	1	783	-	3800	-	0.79	100
TOTAL	151							143							310						
MEAN		522	195	2120	1803	1.08			524	223.6	2347	2268	1.06			506	215.8	2120	2044	1.07	
MEAN AGE	21.0																				

Table 8. Biological data by length interval for tagged lake trout from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	NO.	PERCENT	MEAN FORK LENGTH(MM)	ROUND WEIGHT(G) MEAN	SD
450	1	1	457	-	-
475	4	2	490	-	-
500	3	2	512	-	-
525	9	6	536	-	-
550	20	12	562	-	-
575	15	9	583	-	-
600	17	11	611	-	-
625	14	9	638	-	-
650	13	8	663	-	-
675	7	4	683	-	-
700	7	4	713	-	-
725	8	5	742	-	-
750	3	2	757	-	-
775	7	4	785	-	-
800	6	4	815	-	-
825	7	4	838	-	-
850	3	2	858	-	-
875	2	1	878	-	-
900	4	2	904	-	-
925	3	2	934	-	-
950	4	2	963	-	-
975	1	1	982	-	-
1000	3	2	1006	-	-
TOTAL MEAN	161		680	-	-

Table 9. Weight-length relationship summary, $\log_{10}W = a + b (\log_{10}L)$, for each fish species (sexes combined) from Contwoyto Lake.

Species	N	Y-intercept (a)	Slope (b)	Standard Dev. of b (SD_b)	95% C.I. of b
1981					
Lake trout					
angled	10	-0.9638	1.5827	0.5663	0.277-2.889
gillnet					
- experimental	197	-4.8324	2.9505	0.0403	2.872-3.029
- tagging	131	-5.4620	3.1878	0.0398	3.110-3.266
combined	338	-5.0820	3.0433	0.0287	2.990-3.097
Arctic charr	32	-4.9824	3.0186	0.0659	2.884-3.153
1982					
Lake trout					
gillnet					
- experimental	321	-5.0714	3.0360	0.0184	3.000-3.072
- tagging	75	-5.1638	3.0704	0.0503	2.970-3.171
combined	396	-5.0960	3.0450	0.0167	3.012-3.078
Arctic charr	38	-5.5967	3.2375	0.0652	3.105-3.370
Round whitefish	37	-4.0700	2.6425	0.1391	2.360-2.925
Lake cisco	221	-5.4514	3.2143	0.0514	3.120-3.315
1981 & 1982					
Lake trout					
angled	10	-0.9638	1.5827	0.5663	0.277-2.889
gillnet					
- experimental	518	-4.9856	3.0052	0.0191	2.968-3.043
- tagging	206	-5.3531	3.1463	0.0299	3.088-3.205
combined	734	-5.0950	3.0462	0.0158	3.015-3.077
Arctic charr	71	-5.3683	3.1564	0.0498	3.057-3.256
Round whitefish	39	-4.8323	2.9417	0.1575	2.622-3.261
Lake cisco	221	-5.4514	3.2143	0.0514	3.120-3.315

Table 10. Fecundity of lake trout from Contwoyto Lake.

Date	Fork Length (mm)	Weight (g)	Mean Ovum Diameter (mm)	Total Ovum Count
1981				
22 July	621	3 000	4.7	3 973
27	725	3 900	4.2	4 803
30	793	5 600	4.8	4 545
30	592	2 600	4.9	3 297
13 August	587	2 650	4.7	3 103
13	819	6 750	5.3	6 972
15	673	3 400	4.9	3 682
17	692	3 400	5.0	3 279
17	776	4 450	5.2	5 240
17	839	6 650	4.8	8 235
17	912	9 600	4.2	8 949
17	625	2 750	4.9	3 644
19	701	3 950	5.0	4 169
21	688	3 150	4.9	3 607
Mean	717	4 418	4.8	4 821
1982				
3 August	707	4 550	4.3	4 360
3	573	2 150	4.0	3 928
3	610	2 450	4.3	2 601
3	656	2 700	4.3	2 895
3	596	2 150	4.7	1 645
4	542	1 900	5.0	2 538
4	663	3 700	4.8	4 014
4	653	3 800	4.8	5 560
4	560	2 350	4.1	2 825
5	698	4 000	4.2	5 676
5	615	3 100	4.5	3 576
5	757	4 850	3.8	7 337
6	526	1 650	4.0	1 927
6	820	6 300	4.1	8 211
6	665	3 450	4.6	5 226
7	597	2 300	4.4	3 068
7	652	3 200	4.5	4 933
8	584	2 100	4.7	2 742
8	598	2 350	4.9	2 632
8	523	1 800	4.2	2 689
14	628	2 450	5.3	2 131
17	636	3 300	5.0	4 172
Mean	630	3 027	4.5	3 849
Total Mean	664	3 568	4.6	4 227

Table 11. Biological data by length interval for Arctic charr caught by experimental gillnets from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	MALES						FEMALES						COMBINED					
	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	SD	K	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	SD	K	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	SD	K	% MAT
150	1	183	50	-	0.82	0	2	188	75	35	1.12	0	5	188	70	27	1.04	0
200	3	234	117	29	0.90	0	2	215	150	71	1.47	0	5	226	130	45	1.13	0
250	1	270	300	-	1.52	0	-	-	-	-	-	-	2	274	250	71	1.23	0
300	-	-	-	-	-	-	1	347	500	-	1.20	0	1	347	500	-	1.20	0
500	1	517	1650	-	1.19	100	1	527	1750	-	1.20	100	2	522	1700	71	1.19	100
550	2	573	2125	460	1.12	100	-	-	-	-	-	-	2	573	2125	460	1.12	100
600	4	623	2850	212	1.18	100	-	-	-	-	-	-	4	623	2850	212	1.18	100
650	3	652	3333	257	1.20	100	-	-	-	-	-	-	3	652	3333	257	1.20	100
TOTAL	15						6						24					
MEAN		484	1867	1361	1.12			280	450	657	1.26			400	1294	1342	1.14	

Table 12. Biological data by age group for Arctic charr caught by experimental gillnets from Contwoyto Lake, 1981-82.

AGE (YR)	MALES							FEMALES							COMBINED					
	N	LENGTH(MM) MEAN	SD	WEIGHT(G) MEAN	SD	K	% MAT	N	LENGTH(MM) MEAN	SD	WEIGHT(G) MEAN	SD	K	% MAT	N	LENGTH(MM) MEAN	SD	WEIGHT(G) MEAN	SD	K	% MAT
6	3	212	25.7	83	29	0.85	0	1	190	-	100	-	1.46	0	5	221	38.0	110	55	0.99	0
7	-	-	-	-	-	-	-	2	215	13.4	150	71	1.47	0	3	203	22.1	117	76	1.27	0
9	1	249	-	150	-	0.97	0	1	347	-	500	-	1.20	0	2	298	69.3	325	247	1.08	0
12	1	517	-	1650	-	1.19	100	-	-	-	-	-	-	-	1	517	-	1650	-	1.19	100
15	2	621	43.1	3000	778	1.24	100	-	-	-	-	-	-	-	2	621	43.1	3000	778	1.24	100
16	2	637	19.1	2875	247	1.11	100	1	527	-	1750	-	1.20	100	3	600	64.6	2500	673	1.14	100
17	1	639	-	3150	-	1.21	100	-	-	-	-	-	-	-	1	639	-	3150	-	1.21	100
18	1	556	-	1800	-	1.05	100	-	-	-	-	-	-	-	1	556	-	1800	-	1.05	100
19	2	628	38.9	3050	495	1.23	100	-	-	-	-	-	-	-	2	628	38.9	3050	495	1.23	100
20	1	630	-	2850	-	1.14	100	-	-	-	-	-	-	-	1	630	-	2850	-	1.14	100
TOTAL	14							5							21						
MEAN		500	187	1979	1339	1.09			299	142.0	530	701	1.36			426	196.9	1457	1359	1.14	
MEAN AGE	12.0																				

Table 13. Biological data by length interval for tagged Arctic charr from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	NO.	PERCENT	MEAN FORK LENGTH(MM)	ROUND WEIGHT(G) MEAN	ROUND WEIGHT(G) SD
450	1	17	452	-	-
500	1	17	540	-	-
550	1	17	556	-	-
650	1	17	666	-	-
700	2	33	719	-	-
TOTAL	6				
MEAN			609	-	-

Table 14. Biological data by length interval for round whitefish caught by experimental gillnets from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
180	-	-	-	-	-	-	1	187	100	-	1.53	0	1	187	100	-	1.53	0
200	-	-	-	-	-	-	1	204	50	-	0.59	0	1	204	50	-	0.59	0
230	1	237	150	-	1.13	0	-	-	-	-	-	-	1	237	150	-	1.13	0
300	-	-	-	-	-	-	1	300	300	-	1.11	100	1	300	300	-	1.11	100
320	1	321	350	-	1.06	100	-	-	-	-	-	-	1	321	350	-	1.06	100
330	2	336	350	0	0.93	100	3	337	400	0	1.05	100	5	336	380	27	1.00	100
340	1	342	400	-	1.00	100	2	348	450	0	1.07	100	3	346	433	29	1.05	100
350	5	356	470	45	1.04	100	3	351	450	50	1.04	100	8	354	463	44	1.04	100
360	-	-	-	-	-	-	1	368	400	-	0.80	100	1	368	400	-	0.80	100
370	1	377	600	-	1.12	100	3	372	517	58	1.00	100	4	374	538	63	1.03	100
380	1	380	550	-	1.00	100	-	-	-	-	-	-	1	380	550	-	1.00	100
390	1	392	600	-	1.00	100	-	-	-	-	-	-	1	392	600	-	1.00	100
400	1	402	700	-	1.08	100	1	404	800	-	1.21	100	2	403	750	71	1.15	100
TOTAL	14						16						30					
MEAN		350	457	138	1.03			334	416	172	1.04			341	435	156	1.04	

Table 15. Biological data by age group for round whitefish caught by experimental gillnets from Contwoyto Lake, 1981-82.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
3	-	-	-	-	-	-	-	1	187	-	100	-	1.53	0	1	187	-	100	-	1.53	0
4	1	237	-	150	-	1.13	0	-	-	-	-	-	-	-	1	237	-	150	-	1.13	0
6	-	-	-	-	-	-	-	2	326	36.8	400	141	1.13	100	2	326	36.8	400	141	1.13	100
7	1	321	-	350	-	1.06	100	-	-	-	-	-	-	-	1	321	-	350	-	1.06	100
8	3	344	9.6	383	29	0.94	100	5	342	7.4	410	22	1.03	100	8	343	7.6	400	27	1.00	100
9	4	357	18.0	475	87	1.03	100	5	363	13.5	490	55	1.03	100	9	360	14.8	483	66	1.03	100
10	2	385	10.6	600	0	1.06	100	1	368	-	400	-	0.80	100	3	379	12.1	533	115	0.97	100
12	2	380	31.1	600	141	1.08	100	1	404	-	800	-	1.21	100	3	388	26.0	667	153	1.13	100
TOTAL	13							15							28						
MEAN		350	41	458	144	1.03			342	48.9	440	147	1.07			346	44.8	448	143	1.05	
MEAN AGE	8.5																				

Table 16. Biological data by length interval for lake cisco caught by experimental gillnets from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
150	2	153	38	18	1.04	50	2	159	38	18	0.93	0	7	155	43	12	1.14	14
160	8	166	50	13	1.08	0	10	166	50	17	1.10	0	21	166	51	14	1.11	0
170	10	175	58	17	1.08	10	14	174	64	19	1.21	0	27	175	62	18	1.16	4
180	10	184	70	20	1.13	0	13	185	65	24	1.05	0	24	184	69	22	1.10	0
190	5	194	95	21	1.30	0	12	194	77	25	1.06	17	19	194	80	24	1.10	11
200	2	203	100	0	1.20	0	2	204	75	35	0.88	0	4	203	88	25	1.04	0
220	-	-	-	-	-	-	1	226	125	-	1.08	100	1	226	125	-	1.08	100
300	4	305	375	29	1.32	100	1	308	400	-	1.37	100	5	305	380	27	1.33	100
310	11	316	411	56	1.30	100	14	314	396	60	1.28	100	25	315	403	58	1.29	100
320	18	324	428	46	1.26	100	22	324	391	48	1.15	100	40	324	408	50	1.20	100
330	12	333	440	45	1.19	100	21	333	464	62	1.26	100	33	333	455	57	1.23	100
340	5	343	510	42	1.26	100	4	342	500	41	1.25	100	9	343	506	39	1.26	100
350	4	352	538	48	1.23	100	2	355	550	141	1.22	100	6	353	542	74	1.23	100
TOTAL	91						118						221					
MEAN		266	287	191	1.20			260	262	190	1.16			258	262	191	1.18	

Table 17. Biological data by age group for lake cisco caught by experimental gillnets from Contwoyto Lake, 1981-82.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
2	32	178	11.3	66	24	1.14	3	49	180	12.3	63	23	1.07	4	89	179	12.1	64	23	1.11	3
3	1	204	-	100	-	1.18	0	3	197	24.8	92	38	1.18	33	5	199	17.8	90	29	1.13	20
5	1	150	-	25	-	0.74	100	-	-	-	-	-	-	-	1	150	-	25	-	0.74	100
7	10	325	11.4	428	38	1.24	100	12	323	8.0	438	53	1.30	100	22	324	9.6	433	46	1.28	100
8	32	324	10.0	432	54	1.27	100	38	327	10.7	418	82	1.19	100	70	326	10.4	425	70	1.23	100
9	11	334	16.0	464	90	1.24	100	12	331	9.6	450	52	1.24	100	23	332	12.9	457	71	1.24	100
10	-	-	-	-	-	-	-	1	325	-	400	-	1.17	100	1	325	-	400	-	1.17	100
11	1	349	-	500	-	1.18	100	-	-	-	-	-	-	-	1	349	-	500	-	1.18	100
TOTAL	88							115							212						
MEAN		269	74	295	190	1.21			281	73.7	264	190	1.16			281	74.5	268	191	1.18	
MEAN AGE	5.4																				

Fig. 1. Map of the Northwest Territories showing the location of Contwoyto Lake.

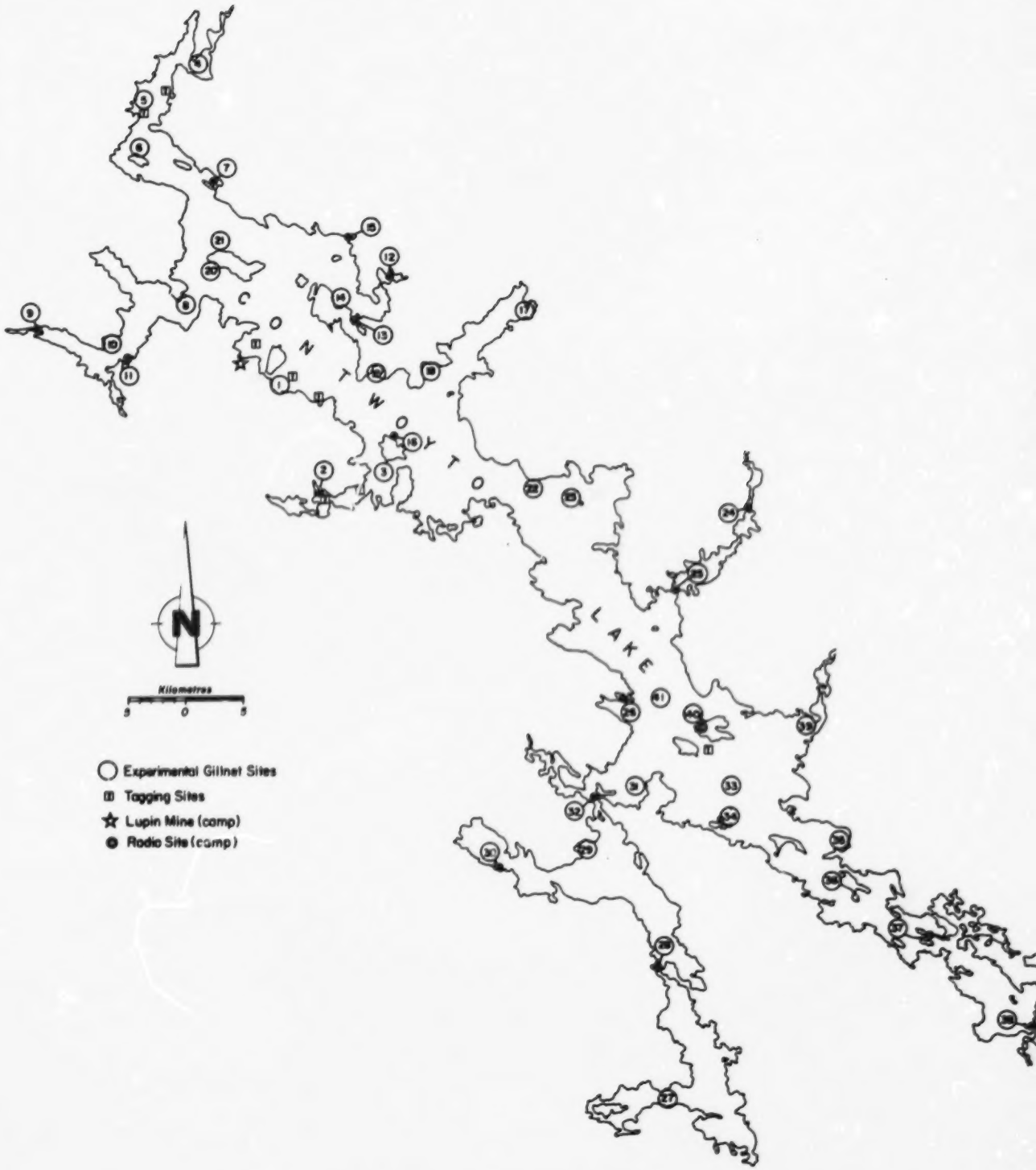


Fig. 2. Map of Contwoyto Lake showing the experimental gillnet locations and tagging sites, 1981 and 1982.

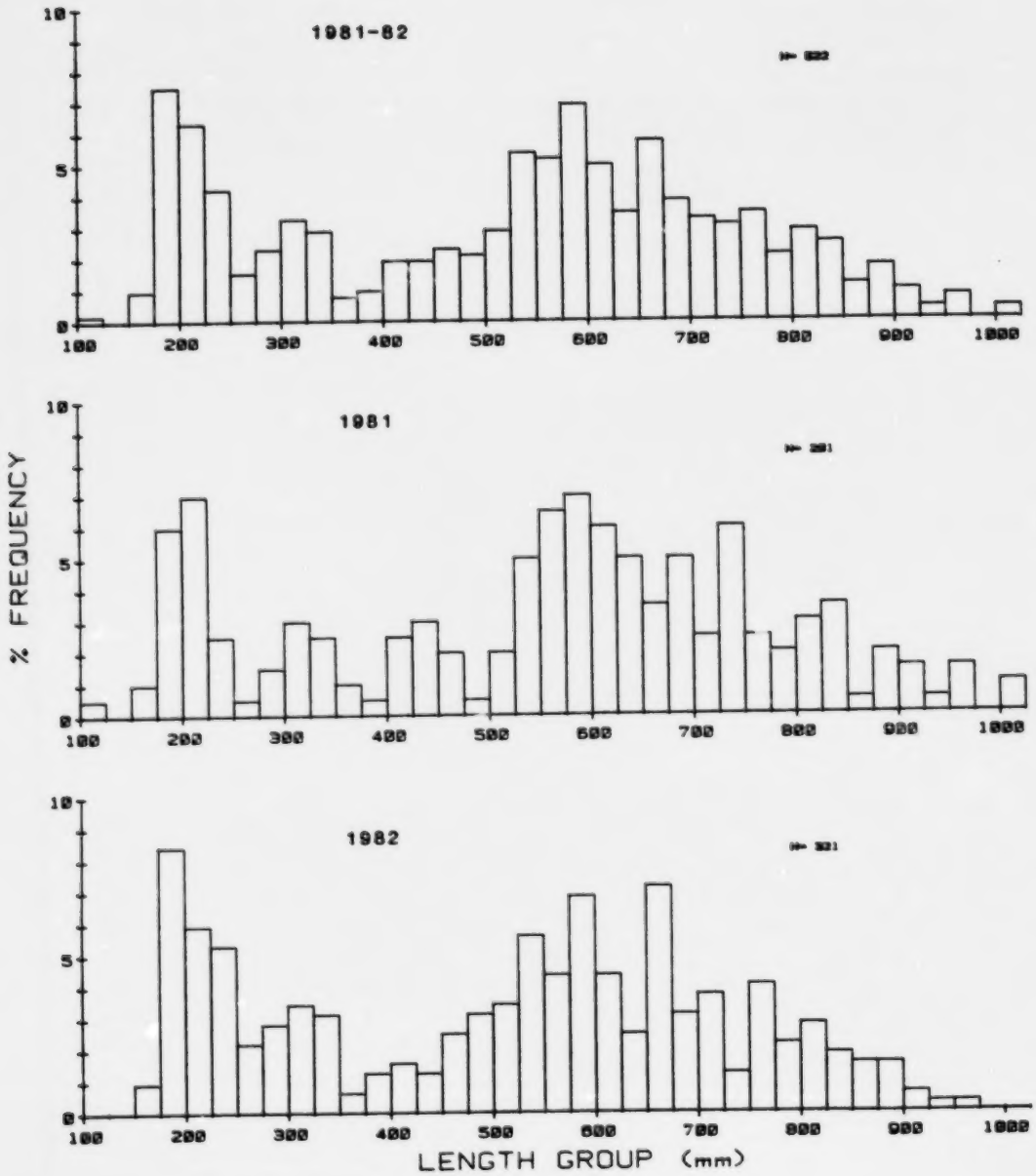


Fig 3. Length-frequency histograms of lake trout from Contwoyto Lake, 1981 and 1982.

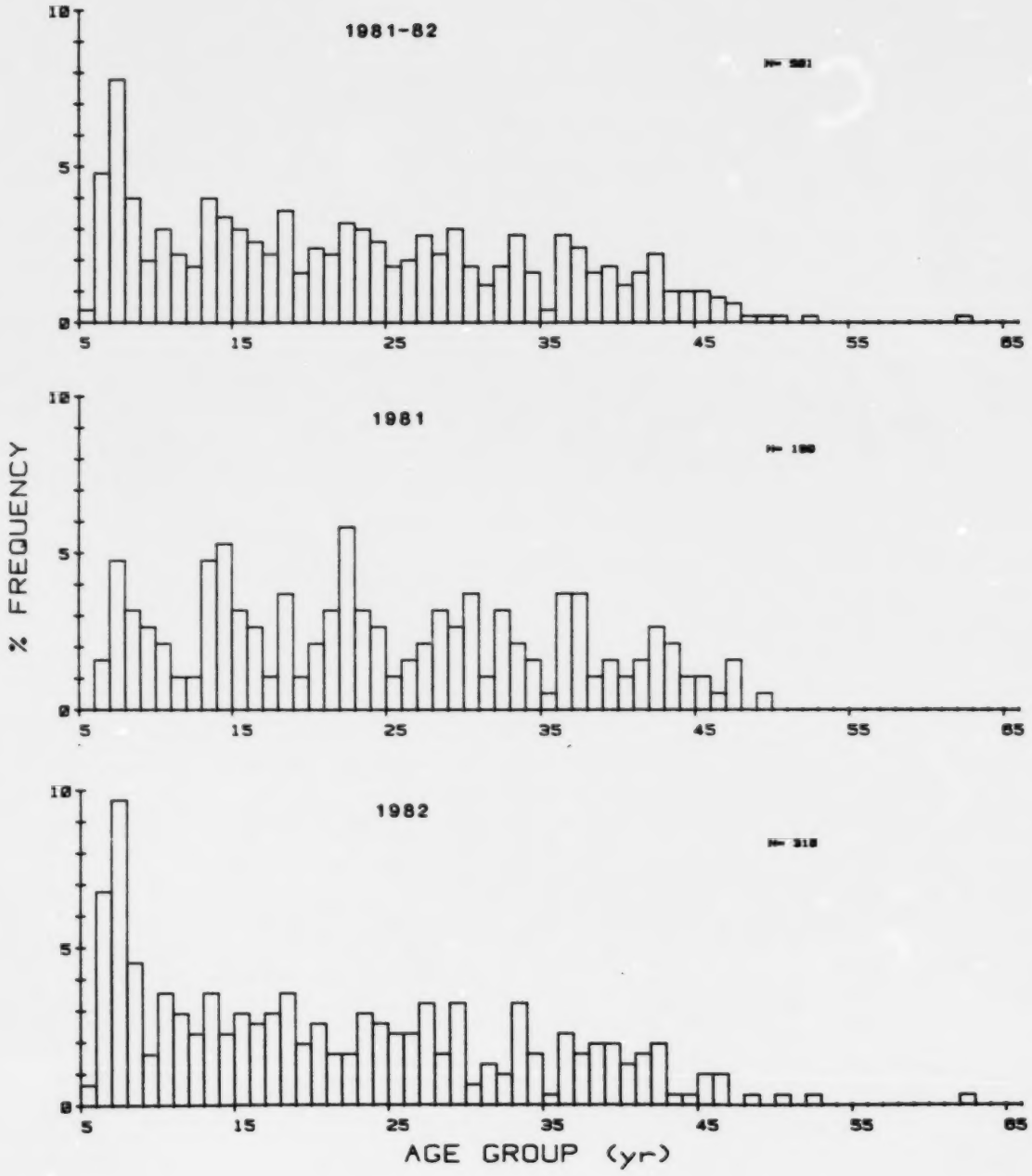


Fig. 4. Age-frequency histograms of lake trout from Contwoyto Lake, 1981 and 1982.

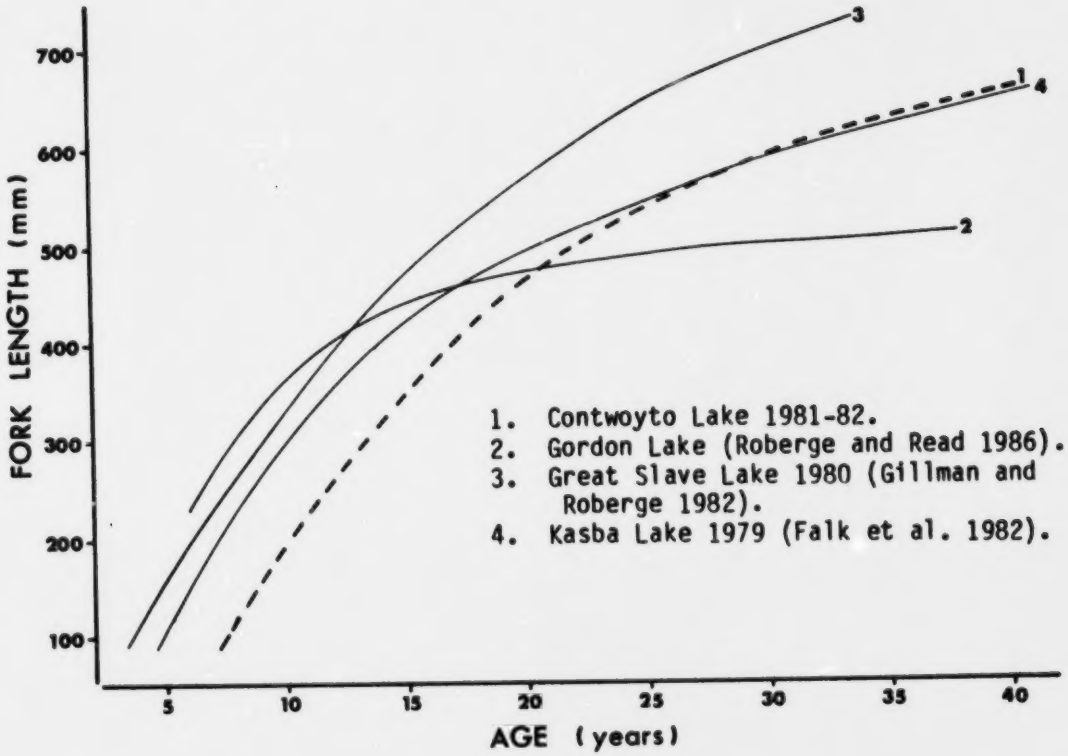
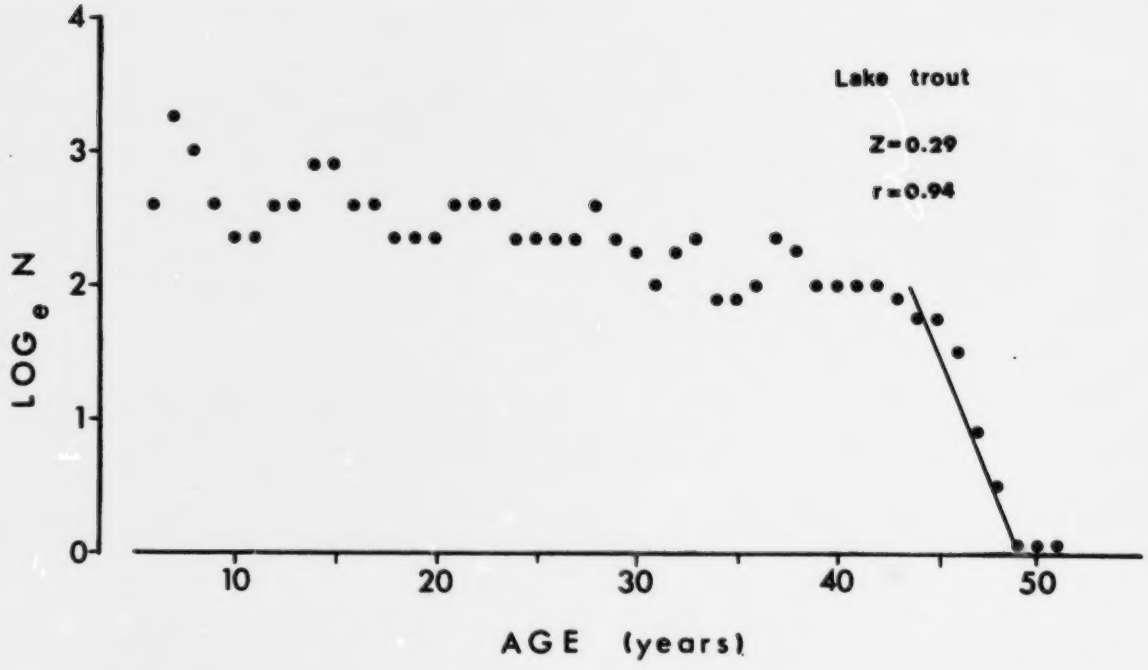


Fig. 5. Length-at-age relationship for lake trout from Contwoyto Lake, 1981-82 compared with other northern lakes.



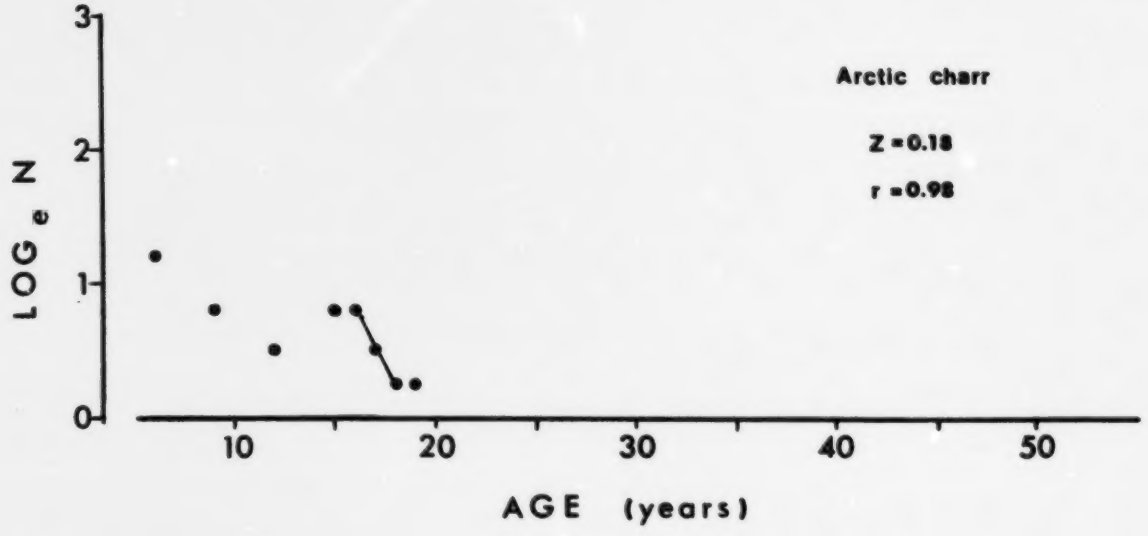


Fig. 6. Catch curves for lake trout and Arctic charr caught by experimental gillnets from Contwoyto Lake, 1981-82.

Appendix 1. Summary of information on sample dates, sample locations, set duration, depth and catch per unit effort (CPE) for experimental gillnets on Contwoyto Lake, 1981 and 1982.

Date[a]	Set Number	Location Number	Set Duration (h)	Water Depth (m)	Total Catch	CPE[b]
1981						
July 17 T	1		20.0	3.0	3	3.9
18 T	2		28.0	3.0	0	0.0
20 T	3		24.5	4.0	2	2.1
21 T	4		28.0	3.0	0	0.0
21	5	1	23.0	2.0-3.0	1	0.5
22	6	2	23.0	3.0-5.0	27	12.3
23	7	3	21.0	3.0-7.0	2	1.0
25 T^2	8		53.0	N/A	20	5.0
25 T	9		22.0	N/A	2	2.4
25	10	4	23.0	3.0-15.0	2	0.9
26 T	11		18.0	3.0-20.0	1	1.5
26	12	5	22.0	3.0-15.0	3	1.4
27	13	6	21.5	3.0-15.0	5	2.4
28 T^2	14		N/A	3.0-15.0	22	N/A
29	15	7	47.5	3.0-15.0	15	3.3
30 T^5	16		23.0	3.0-10.0	27	7.7
30	17	8	21.5	3.0-15.0	1	0.5
31	18	9	22.5	3.0-15.0	2	0.9
Aug 1 T^2	19		22.5	3.0-10.0	17	10.0
2	20	10	22.5	2.0-20.0	13	6.1
4 T^2	21		22.0	3.0-10.0	36	21.5
5	22	11	81.5	3.0-15.0	11	1.4
6 T^2	23		28.0	3.0-10.0	7	3.3
7 T	24		16.5	3.0-10.0	9	14.3
8 T^4	25		30.8	3.0-15.0	20	5.7
8	26	12	47.0	3.0-15.0	5	1.1
11 T^5	27		51.2	3.0-15.0	21	2.7
11	28	13	69.5	3.0-10.0	9	1.4
12 T^5	29	14	23.8	3.0-8.0	6	1.7
13 T^5	30		41.5	3.0-10.0	10	1.6
13	31	15	28.2	3.0-15.0	10	3.7
15 T^4	32		52.8	2.0-10.0	8	1.3
16 T^4	33		19.5	8.0-10.0	6	2.7
Aug 17 T^4	34		23.0	3.0-10.0	5	1.9
17	35	16	48.0	3.0-15.0	34	7.4
19 T^2	36		53.5	3.0-10.0	13	13.2
19	37	17	23.2	3.0-15.0	16	7.2
21 T^2	38		41.5	3.0-10.0	9	2.8
21	39	18	48.0	3.0-10.0	21	4.6
22 T^1	40		23.5	3.0-10.0	3	2.2
22	41	19	22.2	3.0-15.0	11	5.2
23	42		28.8	3.0-10.0	7	4.3
23	43	20	21.0	3.0-20.0	11	5.5
24 T^1	44		24.0	3.0-10.0	15	11.0
24	45	21	23.0	3.0-15.0	15	6.9
1982						
July 31	1	1	24.0	2.0-5.0	11	4.4
Aug 1	2	2	23.0	2.0-3.0	1	0.4
1	3	3	23.5	2.0-3.0	9	3.7
2	4	4	23.0	2.0-6.0	16	6.7
2	5	5	24.0	2.0-4.0	7	2.8
3	6	6	23.0	2.0-4.0	66	27.6
3	7	7	29.0	2.0	29	10.5
4	8	8	22.0	2.0-4.0	18	7.9
4	9	9	22.0	2.0	18	7.9
5	10	10	17.5	1.5-4.0	18	9.9
5	11	11	19.0	1.5-3.0	7	3.5
6	12	12	18.0	1.5-4.0	9	4.8
6	13	13	18.5	1.5-5.0	24	12.5
7	14	14	22.0	1.0-6.0	49	21.4
7	15	15	21.0	2.0-7.0	38	17.4
8	16	16	20.0	N/A	113	54.2
9	17	17	41.0	1.5-2.0	112	26.2
16	18	18	20.0	2.0-4.0	26	12.5
17	19	19	50.0	2.0-3.0	32	6.7
18	20	20	26.0	22.7	3	1.2
Aug 12 T^3	1	1	17.0	2.0-4.0	28	17.3
14 T^3	2	1	43.0	2.0-4.0	42	10.3
15 T^3	3	1	24.0	4.0	17	7.4

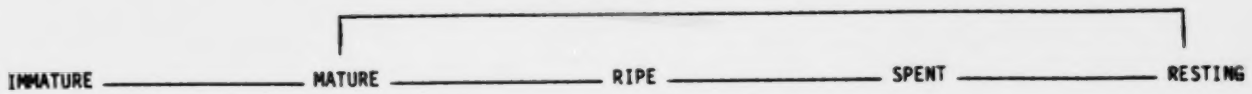
[a] Date only indicates standard gang (1981 229 m, 1982 250 m).
T 64 mm mesh x 91 m.
T^1 64 mm mesh x 46 m and 38 mm mesh x 91 m.
T^2 64 mm mesh x 182 m.
T^3 64 mm mesh x 137 m and 38 mm mesh x 91 m.
T^4 64 mm mesh x 183 m and 38 mm mesh x 91 m.
T^5 64 mm mesh x 274 m and 38 mm mesh x 91 m.

[b] Number fish/100 m/24 h.

N/A = not available.

Appendix 2. A description of the codes used to determine the relative stages of maturity for northern fishes.

MATURITY FLOW CHART



FISH MATURITY CODE

Maturity State		Female		Male
Immature (virgin)	1	- ovaries granular in texture - hard and triangular in shape - up to full length of body cavity - membrane full - eggs distinguishable	6	- testes long and thin - tubular and scalloped shape - up to full body length - putty-like firmness
Mature	2	- current year spawner - ovary fills body cavity - eggs near full size but not loose - not expelled by pressure	7	- current year spawner - testes large and lobate - white to purplish color - centers may be fluid - milt not expelled by pressure
Ripe	3	- ovaries greatly extended and fill body cavity - eggs full size and transparent - expelled by slight pressure	8	- testes full size - white and lobate - milt expelled by slight pressure
Spent	4	- spawning complete - ovaries ruptured and flaccid - developing oocytes visible - some retained eggs in body cavity	9	- spawning complete - testes flaccid with some milt - blood vessels obvious - testes violet-pink in color
Resting	5	- ovary 40-50% of body cavity - membrane thin, loose, and semi-transparent - healed from spawning - developing oocytes apparent with few atretic eggs - some eggs may be retained in body cavity	10	- testes tubular, less lobate - healed from spawning - no fluid in center - usually full length - mottled and purplish in color
Unknown (virgin)	0	- cannot be sexed - gonads long or short and thin - transparent or translucent		
Unknown (non-virgin)	11	- resting fish - has spawned but gonads regenerated - sexing not possible		

Appendix 3. Biological data by length interval for lake trout caught by tagging nets (38 mm and 64 mm mesh) from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	MALES						FEMALES						COMBINED					
		LENGTH(MM)	WEIGHT(G)			%		LENGTH(MM)	WEIGHT(G)			%		LENGTH(MM)	WEIGHT(G)			%
	N	MEAN	MEAN	SD	K	MAT	N	MEAN	MEAN	SD	K	MAT	N	MEAN	MEAN	SD	K	MAT
150	1	165	50	-	1.11	0	-	-	-	-	-	-	1	165	50	-	1.11	0
175	10	186	65	24	1.01	30	8	188	72	36	1.07	13	28	188	68	33	1.01	14
200	14	213	102	23	1.04	43	7	215	89	28	0.88	0	24	213	96	25	0.99	25
225	3	235	133	29	1.02	0	4	238	131	38	0.98	75	8	236	134	30	1.03	38
250	6	261	183	41	1.02	33	3	258	142	14	0.82	0	10	260	168	37	0.95	20
275	4	287	225	29	0.95	0	8	287	247	39	1.04	13	13	286	237	36	1.00	8
300	2	311	400	71	1.32	0	4	310	338	48	1.13	0	6	310	358	58	1.19	0
325	5	330	380	45	1.06	20	-	-	-	-	-	-	5	330	380	45	1.06	20
350	1	365	500	-	1.03	0	2	363	525	35	1.10	0	3	364	517	29	1.07	0
375	6	385	567	88	0.99	33	3	388	567	29	0.97	33	9	386	567	71	0.99	33
400	1	406	900	-	1.34	0	1	411	700	-	1.01	0	2	409	800	141	1.18	0
425	2	434	800	71	0.98	0	1	428	300	-	0.38	0	3	432	633	293	0.78	0
450	1	453	1050	-	1.13	100	2	470	1125	35	1.08	50	4	463	1100	50	1.10	50
475	5	489	1450	94	1.24	60	4	485	1238	48	1.09	75	13	488	1356	133	1.17	46
500	4	512	1538	354	1.14	100	3	510	1667	189	1.25	100	10	511	1593	282	1.19	70
525	11	541	1923	209	1.21	91	2	530	1800	141	1.21	100	22	538	1904	200	1.21	55
550	6	561	2192	139	1.24	100	3	562	2250	100	1.27	100	29	562	2211	124	1.25	31
575	5	584	2220	553	1.12	80	6	595	2633	244	1.25	100	26	586	2445	446	1.19	38
600	4	607	2600	204	1.16	100	3	610	2600	50	1.15	100	24	610	2600	147	1.16	29
625	8	638	3169	438	1.22	100	2	630	2675	318	1.07	100	24	637	3070	452	1.19	42
650	3	652	3083	586	1.11	100	3	662	2967	431	1.03	100	19	661	3025	464	1.07	32
675	2	694	3100	71	0.93	100	1	692	4050	-	1.22	100	10	686	3417	551	1.03	30
700	1	707	4100	-	1.16	100	2	705	3425	318	0.98	100	10	711	3650	450	1.04	30
725	-	-	-	-	-	-	-	-	-	-	-	-	8	742	-	-	-	0
750	3	765	5175	525	1.15	100	1	767	5050	-	1.12	100	7	762	5144	433	1.15	57
775	-	-	-	-	-	-	-	-	-	-	-	-	7	785	-	-	-	0
800	1	809	4900	-	0.93	100	-	-	-	-	-	-	7	814	4900	-	0.93	14
825	2	831	6300	283	1.10	100	-	-	-	-	-	-	9	836	6300	283	1.10	22
850	1	857	7950	-	1.26	100	2	851	4800	424	0.78	100	6	856	5850	1843	0.94	50
875	-	-	-	-	-	-	-	-	-	-	-	-	2	878	-	-	-	0
900	1	907	9400	-	1.26	100	-	-	-	-	-	-	4	905	9400	-	1.26	25
925	1	940	11400	-	1.37	100	-	-	-	-	-	-	4	936	11400	-	1.37	25
950	-	-	-	-	-	-	-	-	-	-	-	-	3	962	-	-	-	0
975	-	-	-	-	-	-	-	-	-	-	-	-	1	982	-	-	-	0
1000	-	-	-	-	-	-	-	-	-	-	-	-	1	1003	-	-	-	0
1025	-	-	-	-	-	-	1	1030	14250	-	1.30	100	1	1030	14250	-	1.30	100
TOTAL	114						76						363[a]					
MEAN		446	1671	1984	1.11			426	1440	2009	1.06			530	1463	1954	1.08	

[a] Includes fish tagged and released.

Appendix 4. Biological data by age group for lake trout caught by tagging nets (38 mm and 64 mm mesh) from Contwoyto Lake, 1981-82.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	178	-	50	-	0.89	0
6	-	-	-	-	-	-	-	2	195	10.6	50	0	0.69	0	2	195	10.6	50	0	0.69	0
7	6	205	19.9	79	19	0.92	0	4	201	18.9	81	38	0.95	0	14	206	21.3	84	30	0.94	0
8	9	221	32.9	111	55	0.97	0	5	236	37.3	140	76	1.01	0	18	219	33.7	107	61	0.94	0
9	3	237	37.5	150	50	1.12	0	2	221	0.0	100	0	0.93	0	6	222	31.8	117	52	1.01	0
10	8	243	55.2	169	96	1.11	38	4	278	14.0	206	43	0.95	0	14	252	47.2	173	83	1.02	25
11	3	267	70.6	267	176	1.31	0	8	302	88.3	375	393	1.03	25	11	292	82.0	345	342	1.11	18
12	7	261	101.2	279	367	1.01	86	5	288	46.2	260	156	0.98	40	12	272	80.9	271	287	1.00	67
13	4	275	79.6	288	284	1.08	75	5	411	75.4	780	391	1.04	20	9	351	101.7	561	417	1.06	44
14	6	384	57.5	733	445	1.17	0	2	405	33.2	425	177	0.69	0	9	369	77.8	594	424	1.06	0
15	4	401	109.8	863	634	1.12	100	2	298	98.3	350	283	1.19	50	6	366	109.6	692	572	1.14	83
16	3	427	120.5	917	666	1.06	33	2	371	183.1	775	955	0.94	100	5	404	128.9	860	675	1.01	60
17	3	478	76.3	1367	778	1.13	67	1	522	-	1800	-	1.27	100	4	489	66.0	1475	671	1.16	75
18	2	530	28.3	1725	601	1.14	100	1	531	-	1900	-	1.27	100	3	530	20.0	1783	437	1.18	100
19	3	485	104.0	1467	839	1.15	67	3	527	63.5	1767	575	1.18	67	6	506	80.5	1617	664	1.17	67
20	5	522	80.0	1690	803	1.12	60	2	549	29.7	2025	460	1.21	100	7	530	67.7	1786	701	1.15	71
21	5	470	92.9	1350	778	1.14	40	1	612	-	2550	-	1.11	100	6	494	101.3	1550	851	1.14	50
22	7	565	57.3	2043	560	1.11	100	3	539	61.5	1933	701	1.19	100	10	557	56.5	2010	567	1.14	100
23	4	562	32.0	2138	427	1.19	75	5	545	104.4	2060	1149	1.13	100	9	553	76.9	2094	854	1.16	89
24	-	-	-	-	-	-	-	1	592	-	2600	-	1.25	100	1	592	-	2600	-	1.25	100
26	2	610	45.3	2750	354	1.21	100	-	-	-	-	-	-	-	2	610	45.3	2750	354	1.21	100
27	2	597	75.0	2425	318	1.17	100	1	600	-	2650	-	1.23	100	3	598	53.0	2500	260	1.19	100
28	3	657	101.6	3350	1179	1.17	100	1	673	-	3050	-	1.00	100	4	661	83.3	3275	974	1.13	100
29	1	707	-	4100	-	1.16	100	2	772	112.4	4275	318	0.98	100	3	750	87.8	4217	247	1.04	100
30	-	-	-	-	-	-	-	1	598	-	3000	-	1.40	100	1	598	-	3000	-	1.40	100
31	5	709	88.2	4260	1714	1.15	100	2	654	79.2	3250	566	1.18	100	7	693	83.3	3971	1502	1.16	100
32	1	593	-	2600	-	1.25	100	1	700	-	3200	-	0.93	100	2	647	75.7	2900	424	1.09	100
33	1	836	-	6100	-	1.04	100	1	662	-	2500	-	0.86	100	2	749	123.0	4300	2546	0.95	100
34	2	588	62.2	2775	1450	1.30	100	1	617	-	2600	-	1.11	100	3	598	47.1	2717	1030	1.23	100
35	2	702	87.7	4288	1255	1.23	100	-	-	-	-	-	-	-	2	702	87.7	4288	1255	1.23	100
36	1	607	-	2650	-	1.18	100	1	767	-	5050	-	1.12	100	2	687	113.1	3850	1697	1.15	100
37	3	681	115.2	3650	1303	1.15	100	-	-	-	-	-	-	-	3	681	115.2	3650	1303	1.15	100
38	-	-	-	-	-	-	-	1	595	-	2500	-	1.19	100	1	595	-	2500	-	1.19	100
41	2	667	31.1	3375	318	1.15	100	-	-	-	-	-	-	-	2	667	31.1	3375	318	1.15	100
42	2	882	35.4	8675	1025	1.26	100	-	-	-	-	-	-	-	2	882	35.4	8675	1025	1.26	100
47	1	637	-	2600	-	1.01	100	1	1030	-	14250	-	1.30	100	2	834	277.9	8425	8238	1.15	100
48	1	940	-	11400	-	1.37	100	1	851	-	5100	-	0.83	100	2	896	62.9	8250	4455	1.10	100
TOTAL	111							72							196						
MEAN		449	198	1695	1998	1.12			433	195.3	1482	2042	1.04			427	199.3	1509	1982	1.07	
MEAN AGE	18.1																				

Appendix 5. Biological data by length interval for Arctic charr caught by tagging nets (38 mm and 64 mm mesh) from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	MALES						FEMALES						COMBINED					
	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	SD	K	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	SD	K	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	SD	K	% MAT
150	1	194	75	-	1.03	0	1	199	50	-	0.63	0	2	197	63	18	0.83	0
200	1	211	100	-	1.06	0	2	203	75	35	0.89	0	3	206	83	29	0.95	0
250	1	293	250	-	0.99	0	4	278	200	58	0.92	0	7	279	214	48	0.98	0
300	7	319	343	53	1.05	43	3	318	317	29	0.99	0	10	318	335	47	1.03	30
350	5	367	540	82	1.09	20	-	-	-	-	-	-	5	367	540	82	1.09	20
400	5	429	961	153	1.21	40	1	402	800	-	1.23	0	6	424	934	152	1.22	33
450	1	478	1500	-	1.37	100	1	451	1100	-	1.20	100	3	460	1300	283	1.29	67
500	-	-	-	-	-	-	3	521	1600	132	1.13	100	4	526	1600	132	1.13	75
550	1	578	2050	-	1.06	100	-	-	-	-	-	-	2	567	2050	-	1.06	50
600	3	632	2883	293	1.14	100	1	631	3000	-	1.19	100	4	632	2913	246	1.15	100
650	3	664	3033	551	1.03	100	-	-	-	-	-	-	4	665	3033	551	1.03	75
700	-	-	-	-	-	-	-	-	-	-	-	-	2	719	-	-	-	0
TOTAL	28						16						52[a]					
MEAN		423	1130	1074	1.10			357	728	839	1.00			419	951	994	1.07	

[a] Includes fish tagged and released.

Appendix 6. Biological data by age group for Arctic charr caught by tagging nets (38 mm and 64 mm mesh) from Contwoyto Lake, 1981-82.

AGE (YR)	MALES							FEMALES							COMBINED					
	N	LENGTH(MM) MEAN	SD	WEIGHT(G) MEAN	SD	K	% MAT	N	LENGTH(MM) MEAN	SD	WEIGHT(G) MEAN	SD	K	% MAT	N	LENGTH(MM) MEAN	SD	WEIGHT(G) MEAN	SD	K	% MAT
1	-	-	-	-	-	-	-	1	631	-	3000	-	1.19	100	1	631	-	3000	-	1.19	100
4	1	194	-	75	-	1.03	0	-	-	-	-	-	-	-	1	194	-	75	-	1.03	0
5	1	211	-	100	-	1.06	0	1	276	-	150	-	0.71	0	2	244	46.0	125	35	0.89	0
7	6	314	20.1	333	93	1.06	33	4	307	22.0	288	48	0.99	0	12	305	23.3	300	80	1.04	17
8	4	369	29.1	552	149	1.08	50	2	281	29.7	225	106	0.97	0	6	340	52.4	443	210	1.04	33
9	3	357	29.9	483	126	1.04	33	-	-	-	-	-	-	-	3	357	29.9	483	126	1.04	33
10	3	398	59.2	783	333	1.17	33	-	-	-	-	-	-	-	3	398	59.2	783	333	1.17	33
11	2	437	12.7	1075	35	1.29	0	2	356	218.5	775	1025	0.87	50	4	396	134.8	925	617	1.08	25
12	1	478	-	1500	-	1.37	100	1	451	-	1100	-	1.20	100	2	465	19.1	1300	283	1.29	100
13	2	614	50.9	2675	884	1.13	100	1	505	-	1550	-	1.20	100	3	578	72.5	2300	901	1.16	100
14	1	650	-	2400	-	0.87	100	1	547	-	1750	-	1.07	100	2	599	72.8	2075	460	0.97	100
16	2	627	10.6	2825	389	1.15	100	-	-	-	-	-	-	-	2	627	10.6	2825	389	1.15	100
17	1	642	-	3000	-	1.13	100	-	-	-	-	-	-	-	1	642	-	3000	-	1.13	100
19	1	693	-	3400	-	1.02	100	-	-	-	-	-	-	-	1	693	-	3400	-	1.02	100
TOTAL	28							13							43						
MEAN		423	142	1130	1074	1.10			378	133.7	823	894	1.00			402	138.9	995	1010	1.07	
MEAN AGE	9.5																				

Appendix 7. Biological data by length interval for round whitefish caught by tagging nets (38 mm and 64 mm mesh) from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
190	-	-	-	-	-	-	1	192	100	-	1.41	0	1	192	100	-	1.41	0
300	1	308	200	-	0.68	100	-	-	-	-	-	-	1	308	200	-	0.68	100
310	1	315	325	-	1.04	100	-	-	-	-	-	-	1	315	325	-	1.04	100
320	-	-	-	-	-	-	2	323	400	0	1.19	100	2	323	400	0	1.19	100
340	2	347	475	35	1.14	100	-	-	-	-	-	-	2	347	475	35	1.14	100
350	-	-	-	-	-	-	1	355	500	-	1.12	100	1	355	500	-	1.12	100
380	1	380	800	-	1.46	100	-	-	-	-	-	-	1	380	800	-	1.46	100
TOTAL	5						4						9					
MEAN		339	455	225	1.09			298	350	173	1.23			321	408	199	1.15	

Appendix 8. Biological data by age group for round whitefish caught by tagging nets (38 mm and 64 mm mesh) from Contwoyto Lake, 1981-82.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
8	1	308	-	200	-	0.68	100	-	-	-	-	-	-	-	1	308	-	200	-	0.68	100
TOTAL	1							0							1						
MEAN		308	-	200	-	0.68			-	-	-	-	-			308	-	200	-	0.68	
MEAN AGE	8.0																				

Appendix 9. Biological data by length interval for burbot caught by tagging nets (38 mm and 64 mm mesh) from Contwoyto Lake, 1981-82.

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
300	1	308	200	-	0.68	100	-	-	-	-	-	-	1	308	200	-	0.68	100
390	-	-	-	-	-	-	-	-	-	-	-	-	1	399	350	-	0.55	0
TOTAL	1						0						2					
MEAN		308	200	-	0.68			-	-	-	-			354	275	106	0.62	

Appendix 10. Biological data by age group for burbot caught by tagging nets (38 mm and 64 mm mesh) from Contwoyto Lake, 1981-82.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
8	1	308	-	200	-	0.68	100	-	-	-	-	-	-	-	1	308	-	200	-	0.68	100
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	399	-	350	-	0.55	-
TOTAL	1							0							2						
MEAN		308	-	200	-	0.68			-	-	-	-	-			354	64.3	275	106	0.62	
MEAN AGE	8.5																				